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“H. G. M.”

By MAJ. SANDERFORD JARMAN, C. A. C.

EDITOR'S NOTE: *We know you know about these target practice reports. We have sweated with you over them. We have watched the plotter develop writer's cramp, the lieutenants develop St. Vitus dance, the battery clerk go over the hill, and the women and children leave the post and retire to places of refuge. But did you ever know what they wanted with all this? Listen . . .*

TO obtain hits per gun per minute an artilleryman must know gunnery and, in addition, be able to apply this knowledge during target practice if he is to succeed during war in destroying an enemy. After having held down the Gunnery desk in the Office, Chief of Coast Artillery, for several years it has been my observation that artillerymen of all grades are very prone to draw general conclusions based on too few observations of the particular event in question. Often an officer upon completion of a target practice will, based on results obtained during that one practice, make specific and radical recommendations as to changes in existing gunnery and target practice regulations without realizing that these instructions are based on lessons learned, not from one practice but from many. In discussing hits per gun per minute it is believed that there are at the present time features connected with this general subject that may be of some interest to the Corps.

The Gunnery Section in the Office, Chief of Coast Artillery, consisting of one officer, one master gunner and one clerk, is primarily concerned with reviewing and studying all target practice reports, including battle practices and joint Army and Navy exercises, in order that an estimate can be had at all times as to whether the objective of the Corps—hits per gun per minute—is being approached. The reports, upon receipt, are checked for correctness and statistical information is extracted therefrom for use: in improving the gunnery and target practice training regulations; in awarding the Knox Trophy; in publishing the annual comments on target practice; in giving a basis for classification of all firing batteries; in bringing to the attention of the various cooperating arms and services any deficiencies, either as to their personnel or matériel. Immediately upon receipt of target practice reports ammunition expenditures are checked and charged against the allowances; scores are verified and errors corrected. It is very rare that any target practice reports for Regular Army or-

ganizations are returned. The entries on the report are not questioned as the certificates of the local commanders are always accepted. The reports are then transmitted to the Coast Artillery Board and the Coast Artillery School where they are reviewed and commented upon. This enables the Coast Artillery School in particular to shape its instruction so as to correct existing deficiencies. Upon the return of these reports to the Gunnery desk they are given a final review—pertinent data is extracted and the graphical analyses made for incorporation in the annual comments on target practice. Detailed extracts of all matériel failures noted in the reports are then made and consolidated by Coast Artillery Districts for submission to the supply departments concerned. This procedure has been of special benefit in keeping the armament and fire control in better condition. In the final review of the target practice reports comments known as “individual comments” are prepared for the Adjutant General to send to Corps Area and Department commanders. These comments are those that are not of such general interest to warrant their incorporation in the annual Coast Artillery memorandum.

Soon after the Gunnery Section was established it was felt that an effort should be made to use all information that was contained or could be incorporated in a target practice report. This is particularly true for large caliber cannon as the obtaining of ballistic information with respect thereto is very expensive, resulting in only a limited amount of firings being had at the proving grounds for that purpose. The maximum yield of information for the Ordnance for their ballistic studies and for the Coast Artillery to improve its gunnery was of paramount importance. This is of much interest at this time, as we are confronted with the problem of delivering effective fire at ranges of forty thousand to fifty thousand yards. Difficulties of spotting and adjusting fire at such ranges make it necessary for an accurate determination of all unknown factors. The matter was taken up with the Ordnance Department and they have cooperated whole-heartedly. They have organized, at Aberdeen Proving Ground, a fire control and ballistic section particularly charged with making a detailed study of target practice information. Members of the Ordnance Ballistic Section visit the Gunnery Office from time to time and make a careful study of target practice reports and extract therefrom all information of use to them. There is a lack of full and accurate data in our firing tables as to the probable error of all calibers of guns at all ranges. Trial shots are fired by practically all batteries prior to service practice. It is hoped that the accuracy of the determination of the mean error of these shots can be made sufficiently reliable to permit of the use of this information by the ballisticians for incorporation with the Proving Ground firings in determining more accurate probable errors. This information is furnished for incorporation in the firing tables when they are revised. The study of

the problem of the effect of erosion on accuracy has been begun. By compiling curves based on target practice results and by making use of limited data on hand at the Proving Ground a start has been made on this subject. In a letter from the Adjutant General, dated April 1, 1929, there was transmitted to all Corps Areas erosion charts for 10-inch and 14-inch Models 1909 and 1910 guns. It is expected that similar charts on other calibers will be prepared some time in the near future.

Another problem in which the Ordnance Ballistic Section has been of particular assistance is in studying and preparing what is hoped will be a method of making the zone to zone correction for mortars. Mortar target practices are now required to be conducted in two zones and with no interruption in the fire to pass from one zone to another. The best way to make a zone to zone correction is a subject that has been before the Coast Artillery Board and the Ordnance for a long period and no satisfactory solution has been arrived at up to date. Various programs have been proposed involving the expenditure of a large amount of ammunition to determine this information. It is hoped that by a careful survey by the ballisticians of the results now being obtained during target practice much valuable information can be obtained toward the satisfactory solution of this problem. For the present, trial shots are required to be fired in the two zones in which the practice is to be held in order to make available needed information.

There has been discussed by different officers the general subject of establishing a central “Powder Desk” for the purpose of studying all reports of any shooting that takes place. It is held by some that the mean of the number of muzzle velocities determined from deviations will give roughly the most probable value of the muzzle velocity which can be used as a check on the velocity deduced from pressures. These data would show where there is considerable and consistent variation from the normal and it can be determined whether or not the normal muzzle velocity or weight of charge as given on the powder tag in the can is in error. The powder desk could compute and plot a curve of muzzle velocities for each lot of powder which will show the behavior of the powder and its deterioration from year to year, and considering this information in connection with the Ordnance surveillance tests it would permit of a prediction being made of the muzzle velocity to be expected. This information will also enable a forecasting of a time prior to which various lots of powder should be used and prevent any loss due to deterioration. The Gunnery Section began, in 1927, a compilation of information along the lines indicated above. In general this consists of keeping for each lot of powder a graph showing the developed muzzle velocity of the powder plotted against the number of rounds fired from the gun. In addition this graph shows the location of the firings. It is hoped that in the next

few years a battery commander may be furnished with a fairly accurate estimate of the expected muzzle velocity for any given lot of powder in any locality. It will be several years before this information is of much value as curves of this nature have to be based on several years' records.

By close liaison with the Gunnery and Target Practice Office of the Navy Department the Gunnery Section obtains first-hand information of the latest developments in all phases of naval gunnery and target practice. The Advanced Gunnery Class, when it reports to the Office of the Chief of Coast Artillery each year, is also given an opportunity of observing the functioning of this office. It is interesting to note that the importance of gunnery in the Navy is shown to the extent of maintaining a section consisting of five officers as well as a goodly number of clerks and civilian computers. All features of Navy target practice are on a highly competitive basis. It is worthy of note that the fundamental basis of their scoring system is H. G. M. with no time out for failure of matériel.

During the past year advantage has been taken of the invitation of the Navy Department to have officers visit the fleet off Guantanamo during target practice. Last year three members of the Advanced Gunnery Class and a gunnery instructor at the Coast Artillery School were present for target practice. Their report on their tour of observation furnished much useful information for use in connection with problems that are constantly arising in the Coast Artillery.

A cursory review of target practice reports indicated that there are a great many matériel failures during target practice. Statistics collected from reports for 1927 and 1928 indicate that in 166 practices held with secondary armament 15% had failures of matériel. Of this 15%, 5% were primer failures. Of the one hundred and twenty-five target practice reports of primary armament examined 47% developed failures of matériel. Of this 47%, 16% were due to primers. A comparison of the per cent of failures of matériel in target practices held in the continental United States and the overseas possessions shows that 22% in the former and 14% in the latter developed matériel difficulties necessitating time out. The cause of this condition is no doubt due to the fact that there are available in the overseas possessions more personnel to care for the armament and the training schedules are such that the battery commander has more time for training and preparing the matériel. Consideration is being given to eliminating the allowance of time out during all target practice for all failures of matériel with the view to correcting this deficiency. This would, in certain cases, work a hardship on the individual battery but it would improve the general situation as such a restriction will force all concerned to devote the requisite time to eliminating defects that are due to lack of proper preparation.

The purpose of target practice is to prepare for battle conditions in

which the object is to make the maximum number of hits per gun per minute during the time of record fire. It is appreciated from a gunnery viewpoint that the best that can be accomplished by a battery commander is to eliminate all personnel errors by correct utilization of the means at hand; reduce the dispersion to a minimum; place the center of impact of shots on the center of the danger space in the minimum of time with the minimum expenditure of ammunition and keep it there during continuous fire. It is also appreciated that efficiency in battle must be measured by the hits per gun per minute. When the situation calls for slow fire at very extreme ranges no difficulty will be experienced in delivering this type of fire if the battery has been trained to obtain the maximum H. G. M. The ability to handle service practice ammunition in continuous loading and firing is a mark of efficiency and such facility cannot be perfected with dummy ammunition in which the powder charges are much easier to handle and the projectile behaves differently. In drill, without actual firing, continuous service of ammunition is difficult to simulate. Sections may be very skillful at drill, yet fail in smoothness of action at their first few service practices. The mechanism of the practice is destroyed when the pieces cannot be served continuously and a part of the instructional value of the practice is sacrificed. An examination of all record target practices held during one year indicates that in every practice that was adjusted, hits were made. In each practice where no hits were obtained the battery was not adjusted. This indicates that the battery commander who gets H. G. M. is the one who has an adjusted battery. You hear it said quite often that luck has a great deal to do with getting hits during target practice and that a poor battery commander may be lucky in hitting the target. This is conceded as liable to happen once in awhile—so does the holding of four aces in our favorite game. One hundred record target practice reports were chosen at random from those that had been classified by the War Department as excellent and the efficiency records of the battery commanders during the target practice were examined and show that these officers had been classified as follows:

2% superior.

55% excellent.

43% average.

This indicates that good battery commanders are usually the lucky battery commanders. Luck fortunately follows a good battery commander.

The importance of promptly opening record fire after trial shots is not appreciated by all. In plotting the curve in Figure 1 the records of target practice for two years were carefully examined and the deviation of the first correction made during record fire was plotted against elapsed time between firing trial shots and commencement of record fire. This curve indicates the importance of promptly opening record fire. Every effort

should be made to have the tug in such a position as to obviate delays. The requirement on the target practice report necessitating an explanation of a delay of more than ten minutes has been of benefit in reducing such delays.

A study is made yearly showing a comparison of the results of various methods of observation. The figures indicate the average spotting error

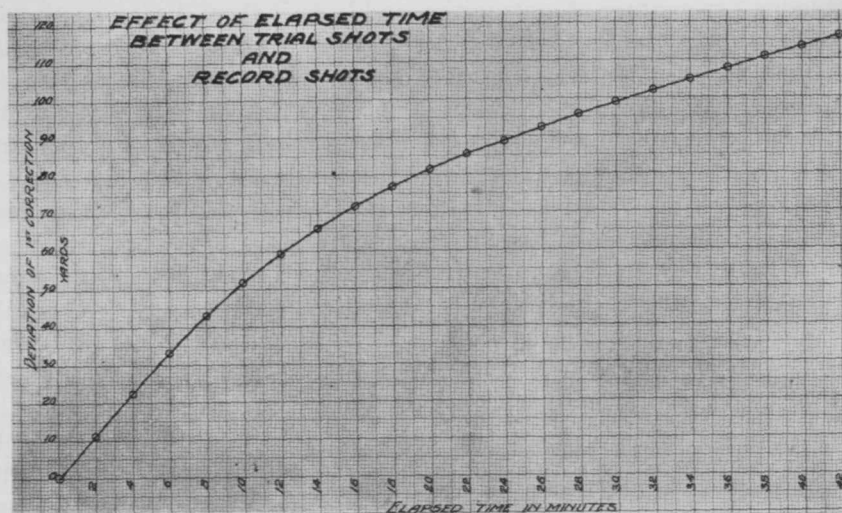


FIG. 1

as compared with the camera results. For the year 1927 the results are as follows:

Type of Spotting	Secondary Armament	Primary Armament	Secondary and Primary Armament
	Av. Error, Yds.	Av. Error, Yds.	Av. Error, Yds.
Gray Board	32	62	41
Gray Board, Modified	18	41	31
Hatch Board	43	55	48
Cole Board	70	34	40
Goodall Board .....	.....	45	45
Plotting Board	32	60	56
Airplane	52	63	60

The following tabulation indicates a comparison between certain results obtained in 1927 and 1928. The figures shown are based on the percentage of target practices fired, and are self-explanatory except as to the item "adjusted." In order to compare the number of practices "adjusted" in 1927 with the number "adjusted" in 1928 it was necessary to re-examine all 1927 reports and apply the same rule for determination of adjustment as was used for 1928. The figures under item "adjusted" in Column 2 are based on using the D. A. P. E., whereas in Columns 3 and 4 they are based on using one-half the D. A. P. E.

			1	2	3	4
			<i>Record Practices</i>	1927	1927	1928
<i>Primary Armament</i>	(1)	Adjusted		41.5	19.5	37.5
	(2)	Spotting satisfactory		87.8	.....	82.5
	(3)	More than four trial shots.....		29.3	.....	10.0
	(4)	Air spotting available		39.0	.....	40.0
<i>Secondary Armament</i>	(1)	Adjusted		59.6	36.2	37.8
	(2)	Spotting satisfactory		95.7	.....	91.1
	(3)	More than four trial shots.....		57.4	.....	62.2
	(4)	Air spotting available		27.7	.....	17.8
<i>Primary and Secondary Armament</i>	(1)	Adjusted		51.1	28.1	37.6
	(2)	Spotting satisfactory		92.0	.....	87.0
	(3)	More than four trial shots.....		44.3	.....	37.6
	(4)	Air spotting available		33.0	.....	28.2
<i>Preliminary Practices</i>						
<i>Primary Armament</i>	(1)	Adjusted		50.0	28.6	18.8
	(2)	Spotting satisfactory		85.7	.....	62.5
	(3)	More than four trial shots		21.4	.....	12.5
	(4)	Air spotting available		17.9	.....	34.4
<i>Secondary Armament</i>	(1)	Adjusted		54.3	31.4	29.4
	(2)	Spotting satisfactory		88.6	.....	70.6
	(3)	More than four trial shots.....		17.1	.....	44.1
	(4)	Air spotting available		22.9	.....	26.5
<i>Primary and Secondary Armament</i>	(1)	Adjusted		52.4	30.2	24.2
	(2)	Spotting satisfactory		87.3	.....	66.7
	(3)	More than four trial shots.....		19.0	.....	28.8
	(4)	Air Spotting available		20.6	.....	30.3
Grand total (all practices) adjusted.....				51.7	29.1	31.8

It is interesting to note that in general a greater percentage of practices were adjusted during 1928 than during 1927. The spotting for batteries shows an improvement in the record practices over those of the preliminary. This indicates that during the preliminary practice the personnel learned how to spot. There is also shown the percentage of practices in which air spotting was available for battery commanders. This does not indicate that air spotting was used in all cases. The necessity for employment of air spotting at long ranges and under adverse visibility conditions is apparent to all. It is necessary to develop this feature of training. In order to do this instructions were recently issued by the War Department prescribing that during all preliminary practices with guns above 6-inch that Air Corps observation will be obtained and used for adjusting fire. The Air Corps have instituted a check-up system on their observers. To facilitate this it is now required that there be indicated on Form No. 25, as shown in TR 435-55, the name of the observer cooperating in the target practice.

In order to improve further the training of Air Corps personnel in

the observation of seacoast firing special 10-inch firings for the primary purpose of training aerial observers in furnishing sufficient data for firing the battery have been authorized in the Harbor Defenses of Long Island Sound, Chesapeake Bay, Pensacola and San Francisco. It has been the experience in the past that where aerial observation has been provided results of this observation have not, in many cases, been used but that greater dependence has been placed upon terrestrial observation. Under these conditions it has not been possible to fully train personnel or develop this type of observation to the fullest extent.

By recent instructions from the War Department the target practice year has been changed to coincide with the fiscal year. This will result in all target practices that are held between January 1, 1929, and June 30, 1930, being grouped together for the purpose of classification, and the preparation of the annual comments on target practice. The next Coast Artillery memorandum that will be issued will be Coast Artillery Memorandum No. 10. It is hoped to get this memorandum printed and distributed shortly after June 30, 1930.

Training Regulations No. 435-55 "Coast Artillery Target Practice" is now under revision. It is expected that the new edition will be available and effective on June 30, 1930. In the revision of this regulation existing errors will be corrected. In addition it is hoped to incorporate new problems in the analysis of drill and target practice as well as all pertinent data in reference to the antiaircraft trial shot problem.

In the rewriting of this regulation there will be some important changes made in the manner of conducting antiaircraft target practice. In view of the general interest to all of the basis of these changes the following extracts from official correspondence are quoted.

Extracts from letter Chief of Air Corps to the Adjutant General, April 19, 1929:

"1. Attention is invited to the provisions of subparagraph *b*, Par. 24, Section IV, Antiaircraft Artillery, of the above-mentioned training regulations.

"2. *a*. Under these regulations the pilot of the towing airplane is given a fixed course and altitude by the regimental or harbor defense commander for all antiaircraft firings. Although it is necessary to prescribe certain zones in which the airplane must be flown, I believe that latitude should be permitted the pilot towing the airplane in certain classes of firings. A fixed course and altitude may be essential for preliminary practices in order to give training to the battery personnel. However, I strongly recommend that in all record and demonstration practices not more than 50% of the runs be made at a fixed altitude and over a fixed course, and 50% of the runs be made over courses and at altitudes and speeds unknown to the antiaircraft personnel.

"*b*. This recommendation is in accord with that made in the Report of Board on Antiaircraft Exercises, 1928, Part I, Section VII, Page 159, Par. 293:

'Air Missions. That the same policies and methods as used during these tests be adopted for approximately 50% of any future exercises and that in the remaining 50% the latest type of aircraft be used employing service methods of flight, and that the results of this latter kind of exercises be shown separately.'

“c. The ‘service methods of flight’ referred to in the above quoted recommendation consist of such limited maneuvers by the towing airplane as are consistent with safety precautions. The actual maneuvers of the target in such cases are limited to about one-third of that of the towing plane due to the inertia of the long towing cable.

“3. Firings conducted as recommended above will more nearly simulate actual conditions, and further, the Air Corps itself will obtain some practice and information as to the best methods of conducting their flights when under threat of antiaircraft firing.”

The following are extracted from the reply by the Chief of Coast Artillery on this subject:

“1. I concur in the desire expressed by the Chief of Air Corps to approach, as nearly as practicable under peace conditions, the characteristics of targets which will be encountered in war. In order to be in accord with the recommendations contained in the report of the Board on Anti-aircraft Exercises, 1928, with reference to air missions, there has been under discussion and preparation for some time certain proposed changes that should be made in TR 435-55. The rules governing target practice for the year 1929 were in the hands of the printer prior to the receipt of the recommendations of the Antiaircraft Board, 1928. In view of the fact that all battery organizations in the Coast Artillery are on a competitive basis it was realized that it was not practicable to make the changes in TR 435-55 effective until the end of the 1929 target practice year (December 31, 1929)¹. It is proposed to recommend, in time for the publication to the service prior to January 1, 1930, certain changes in TR 435-55 that will embody the following basic scheme of procedure in conducting anti-aircraft target practice:

“a. Target courses for 3-inch antiaircraft guns—

(1) *For preliminary firing.* The target will be towed for safety purposes, on straight courses at a constant altitude and constant speed if, in the opinion of the harbor defense or regimental commander, such methods are necessary.

(2) *For record firing.* (a) For all practices the minimum slant range will be three thousand yards and the maximum sixty-five hundred yards. Every effort will be made to have practices conducted at as near the service altitude of the loaded bomber as practicable and at as long slant ranges as possible within the limits above prescribed.

(b) The maneuvers executed by the target will be limited to those which a loaded bomber would execute in approaching and dropping bombs on the objective.

(c) When the target for 3-inch guns is towed by a plane other than

¹ Due to change of target practice year the new TR 435-55 will not be effective until June 30, 1930.

a bomber the limits of altitude and speed will not exceed those at which the service bomber carrying full load would fly.

(d) One day record practice will be fired at approximately each of the following angles of approach: 90 degrees, 45 degrees, zero degree.

(e) One night service practice will be fired at an angle of approach of 90 degrees.

(f) At least one practice will be conducted with the target at an angular elevation greater than 45 degrees.

"b. Target courses for antiaircraft machine guns—

(1) *For preliminary firings.* The target will be towed, for safety purposes, on straight courses at a constant altitude and constant speed if, in the opinion of the regimental or harbor defense commander, such methods are necessary.

(2) *For record firings.* (a) The maximum altitude will not exceed 1,000 yards.

(b) Two record practices will be fired with 90-degree angle of approach; one record practice will be fired with 45-degree angle of approach and one record practice with zero degree angle of approach.

(3) In flying all the courses for the record practices the towing airplane will fly as would an attack plane in making an attack against ground troops.

"c. All courses will be within the limiting ranges indicated in Pars. 1a(2)(a) and 1b(2)(a) and within the safety limits of the field of fire as determined by the regimental or harbor defense commander. The information as to courses, angles of approach, and safety angles will be indicated upon a chart for all antiaircraft service practices or searchlight exercises by the regimental or harbor defense commander to a plane director, who will be a field officer of the Air Corps or the senior Air Corps officer available.

NOTE: The purpose of requiring the senior Air Corps officer to be actually present is in order that he may actually observe the manner of flying of the tow target plane and also appreciate safety conditions that have to be established for the safety of the towing plane.

"2. It will be noted that a number of changes have been made in the courses prescribed for targets for the antiaircraft guns and machine guns. Attention is invited to the fact that for the antiaircraft guns a change over previous requirements has been made whereby it is contemplated that in one of the courses, the target will be towed directly over the battery. This will necessitate the use of a longer towline. The Navy has similar practices employing a towline of seven thousand feet but they fire a 5-inch high explosive shell. It would appear that a towline of at least three thousand or four thousand feet would have to be used.

"3. The object of the changes proposed is to simulate, as nearly as safety requirements will permit, service conditions. It is appreciated that the drag of the target limits the speed and maneuverability of the tow plane and that the target does not conform accurately to the movements of the plane. In order to determine exactly just what the maneuverability of a bombing plane with full service load is, it is recommended that the Air Corps supply a bomber for the conduct of tests at Aberdeen Proving

Ground where there are means, with the camera obscura of accurately tracking a plane through the heavens. General rules could simulate the actual flight of a bomber and provide data for determining the most effective method of training to combat enemy bombers. It would also afford the Ordnance Department an opportunity to study the development of antiaircraft matériel to better combat the present-day bomber and the requirements to meet future development of the bombing plane. It is recommended that this paper be referred to the Chief of Ordnance for remark on the above proposed test.

“4. With reference to the subject matter at issue in the basic communication attention is invited to the following:

a. *Antiaircraft guns.* Par. 25 h, TR 435-55 makes it mandatory that the target courses for *preliminary* practices ‘be towed for safety purposes on straight courses at constant altitude and constant speed,’ for *record* practices no restrictions exist as to the courses, altitude or speed. Par. 33e limits the slant range of these record practices to a minimum of three thousand yards and prescribes that one practice will be at an elevation of 45 degrees.

b. *Antiaircraft machine guns.* Par. 33e, TR 435-55 prescribes that ‘for both preliminary and record practices of machine gun batteries at towed aerial targets the altitude used by the towing plane will not be greater than one thousand yards. Two record service practices will be fired with 90-degree angle of approach; one record service practice with 45-degree angle of approach; and one record service practice with zero degree angle of approach.’

c. Par. 24b, TR 435-55, in which the general duties of the harbor defense or regimental commanders are prescribed, states that he ‘will prescribe the character of the firing and the period during which it will be held for each organization in his command. Prior to all antiaircraft service practices or searchlight exercises the regimental commander will furnish each pilot detailed to tow antiaircraft targets with a chart upon which is a horizontal projection of such courses as may be desired during practice or exercise. The regimental commander will indicate to the pilot, in writing, what course or courses he is to fly during the practice or exercise. The regimental commander will be in charge of all service practices and searchlight exercises conducted by organizations of his command. All changes in courses or altitude during a practice or exercise will be made only at his direction.’

When this training regulation was issued the purpose of the section just quoted was to provide regulations that would establish such safety precautions as the experience gleaned from several years’ firings had shown to be necessary. These regulations were intended to place in the hands of one person (regimental or harbor defense commander) the responsibility for the execution of the safety precautions. Such procedure is still necessary and must be continued in order that the past record of no accidents as a result of antiaircraft firing may be maintained.

"5. In connection with the remarks of the Chief of Air Corps in Par. 2a of basic communication I wish to point out that he, as well as a great many other officers in the Air Corps, is under a totally erroneous apprehension in regard to the firing organizations having knowledge of the altitude and course of the towing plane. The fact is that the regimental or harbor defense commander fixed an approximate course and altitude for the towing plane. This course is not known to the battery commander who is to fire or to any of his personnel although if it were known, such knowledge would furnish no assistance in firing. It must be apparent that precise firing data must be obtained instrumentally at the moment of shooting. Any knowledge that the target is to fly in a certain part of the sky would be of no assistance in placing bursts at the target. The latest types of instruments will give almost instantaneously the slant range and altitude.

"6. With reference to the 'service methods of flight' attention is invited to the fact that the normal mission of antiaircraft guns is to combat enemy bombing craft. Therefore it is desirable to simulate as closely as possible with the tow target the action of a bomber, in order that no false ideas may grow up in either the Air Corps or Antiaircraft Artillery as to the employment of either airplanes or antiaircraft artillery. So far as the machine guns are concerned the normal mission of these weapons is to take under fire any aircraft that come within their range. I desire to impose no restriction whatsoever on the maneuvers that the towing plane may indulge in so long as the target is kept within the field of fire and such safety precautions as will protect the airplane are observed.

"7. It is recommended that tow target airplanes of suitable power to permit of employing service methods of flight as determined by the tests at Aberdeen Proving Ground be furnished by January 1, 1930, to those Air Corps units that now tow targets for antiaircraft organizations in order that these planes may be available for all antiaircraft target practices to be held in 1930."

Extracts from further remarks by the Chief of Air Corps are as follows:

"Contrary to the statement made in Par. 5 above, I am fully cognizant of the fact that knowledge of the course and altitude is of no assistance to the firing personnel. However, I do object to the towing of targets on a fixed course, at constant speed and altitude, because such methods of flying do not represent the means to be employed by aircraft in avoiding antiaircraft fire. It must not be expected that bombers will be subjected to antiaircraft gun fire solely during the short period of direct approach on the objective."

In instructions published by the War Department directions have been given directing the Chief of Air Corps and the Chief of Ordnance, and Chief of Coast Artillery will arrange for tests of the maneuverability of a loaded bomber as outlined above.

A problem that has been of much interest in developing better means of obtaining more hits per gun per minute is whether to give the same weight to the correction called for by the first four record shots as the

correction indicated by the trial shots. To state the problem another way—should a correction equal the mean or one-half the mean of the deviations of the first four record shots be made. The following facts bearing on this subject are of interest.

The average deviation of all trial shots in the two hundred and ninety-three target practices examined for 1927 and 1928 was two hundred and one yards. This is enormously large. It indicates how little we know, before firing, about muzzle velocity and atmospheric conditions. This value must certainly be reduced before we can hope to open effective fire or carry on effective fire in cases where adjustment is impossible.

The 1928 results, considering one hundred and forty-seven cases, gives the average deviation as one hundred and eighty-eight yards as compared with two hundred and thirteen yards for 1927 alone. While this is an improvement, it still is too large, and a greater effort should be made to get more reliable data on both muzzle velocity and atmospheric conditions.

The average deviation of all trial shots fired on a moving target (ranging shots) in the twenty cases considered in 1928, was found to have been one hundred and fifty-seven yards, while the average deviation of trial shots fired at a fixed point during the same year, in one hundred and twenty-seven cases, was one hundred and ninety-three yards. It is not apparent why the presence of the matériel target should make the accuracy any greater. It ought not to be very difficult to observe on the splash, and the fact that the matériel target is near it should be of no assistance. The 1927 results were not considered due to the fact that from available records it was not certain that all the practices listed under moving targets actually were fired at a moving target (ranging shots) or were fired at a fixed target using the method of successive approximations.

The average deviation of the center of impact of the two hundred and thirty-one practices here considered (for both years) had the correction called for by the trial shots been applied and no personal errors been made, is one hundred and two yards. This value is large and probably arises from one or both of two sources. The probable sources are: The existence of a warming-up effect, and gross errors in determining the deviation of the trial shots. Apparently the latter is the greater contributing factor. In this connection it is noted that in the eighteen cases in 1928 the success of the trial shots in bringing the center of impact within fifty yards of the target was 94.5% (seventeen practices). The average deviation of the center of impact from the target after the application of the trial shot correction in these eighteen cases was thirty-eight yards.

Of the two hundred and thirty-one practices considered, one hundred and two, or 44.2%, indicated that the center of impact of the “shoot” was within fifty yards of the target.

The first four record shots failed to indicate the center of impact of the "shoot" in the two hundred and thirty-three practices considered in 1927 and 1928 by an average of fifty-six yards. This value is fairly small and is quite satisfactory. It seems well within what should be expected. The possible existence of warming-up effect entering into this value, however, is admitted.

It must be borne in mind that the first four record shots are used in calculating the stripped center of impact of the shoot. Therefore they are bound to be nearer the center of impact than they would be if the stripped center of impact of the remaining shots were calculated separately. This is especially true of the large guns that fired few record shots.

The results indicated, therefore, are of somewhat less magnitude than would be the case if the stripped center of impact of the remaining shots were calculated. The same is true of the results calculated for the one-half corrections. However, the results indicated show the relative value of the full and the one-half corrections, and if anything, favor the one-half corrections.

From the two hundred and thirty-three practices considered, one hundred and forty-eight, or 63.5%, indicated that the center of impact of the "shoot" was within fifty yards of the target.

It would seem apparent, since the trial shots have failed so miserably in indicating the center of impact, that the application of a half correction for the deviation of the first four record shots would be improper. Had this been done in the two hundred and thirty-three practices considered for both years, the average deviation of the center of impact of the practices would have been sixty-eight yards as against fifty-six yards when the full correction was applied. Also only one hundred and twenty-three practices, or 52.8% indicated that the center of impact of the "shoot" would have been within fifty yards of the target had one-half the deviation of the first four record shots been applied, as compared to one hundred and forty-eight practices or 63.5% had a correction equal to the full deviation of the four record shots been applied.

A further analysis shows that in one year only, namely, 1928, a correction amounting to one-half the deviation of the first four record shots will bring the center of impact of the "shoot" closer to the target than the full correction, and then only in the case of the secondary armament, especially when the average deviation of the trial shots is small. The practices in which this was the case were the 6-inch B. C., the 155mm., and the 8-inch railway practices. These also were the only ones that fired ranging shots during 1928. It was also seen that the average deviation of the trial shots in the case of the secondary armament is small compared to the primary armament, being one hundred and thirty-five yards as compared to two hundred and eighty-one yards for both years.

Also in no case, either in 1927 or 1928, were the one-half corrections as effective as the full corrections with the primary armament. This would seem to indicate that: the possible warming-up effect has a greater effect on the primary armament than on the secondary, and undoubtedly the atmospheric conditions, effect of muzzle velocity, etc., while perhaps not better known in the secondary armament than in the primary, have much less effect on the trajectory, due to the smaller time of flight, low maximum ordinate, etc. This problem can be summed up as follows:

Due to the unreliable data available at the present time on atmospheric conditions, muzzle velocity, etc., as shown by the great magnitude of the average deviation of the trial shots, a correction amounting to the full deviation of the first four record shots is apparently most effective to bring the center of impact of the "shoot" close to the target.

That where the deviations of the trial shots are small, indicating reliable data, a one-half correction based on the first four record shots might be advisable, but only in the case of the secondary armament. This method should only be used, however, when it is certain that the trial shot data is reliable and possibly only when firing ranging shots at the moving target when there is a minimum chance of error in observation due to the fact that the spotters have a visible point from which to measure deviations.

That when the center of impact of the "shoot" has been brought close to the target, which should be the case after the first four record shots, it would seem that one-half corrections based on the next series of shots (say four) would probably be more effective than full corrections.

These studies covering two years are indicative only, and will be carried on over a series of years to verify the above tentative conclusions.

Fifty yards has been assumed arbitrarily as a unit of measurement to determine a "good" adjustment. In future studies, this unit of measurement will be one probable error of the armament for the average range fired during the practice instead of a flat fifty yards. This will put all armament on a better comparative basis.

A discussion of hits per gun per minute immediately brings up the question of scores. The question of a score for target practices is quite irritating to some Coast Artillery officers. You hear remarks that all a battery commander has to do is to go out and shoot at the water and obtain a rapid rate of fire without any regard to where the shots fall. Another will remark that every one is shooting at the score. The score has been built up with the idea that it will be a target to shoot at, for statistics show that the battery commander who hits the score also gets H. G. M. Targets don't record the shots that went wide of the mark. Nor does history carry them on her score cards. In a very few rare cases the fast shooting and rapid missing battery commander has made an excellent score. An examination of the yearly classification of batteries will show this battery has not been classified as excellent.

It is admitted that a perfect score is difficult to obtain. One that will not work a slight injustice now and then is also most difficult of determination. Having a score capable of having introduced therein components that will correct deficiencies that are known to exist justifies its use. A feature of the scoring system that has been difficult is the fact that during 1927 and 1928, for seacoast artillery, there has been a limited score, whereas for antiaircraft artillery the score has been unlimited. For the year 1929 there is no limit on the score for organizations firing a seacoast battery. It is expected in a short time to have the expectancy curves for both antiaircraft and seacoast artillery so perfected that they can be placed on a basis of a score of one hundred being perfect. Much data has been obtained on the actual expectancy of hits with all types of armament. Scores, figures of efficiency and figures of merit have been employed from time to time in the Coast Artillery, all for specific reasons made necessary by conditions at the time. When the score was adopted in 1926 it was found that certain organizations ordinarily assigned to a two or four-gun battery were manning during target practice a less number of guns. Local commanders were losing sight of the fact that a battery commander had an entirely different problem for solution when he was required to actually coordinate the fire of a two-gun battery instead of a one-gun battery. By penalizing the battery score such conditions have been corrected. In a like manner the proper training of gun crews had been overlooked to such an extent that 12-inch guns were being fired at a rate of fire of over sixty seconds; mortars about every one and one-half minutes. By introducing a heavy penalty in the score for slow firing there has been great improvement made in this feature. Another reason for the necessity of a score is to provide a means whereby a central agency can classify all organizations. At the time the score was introduced the Army regulations were changed to provide as follows:

"Insignia to denote excellence of organizations in the Coast Artillery Corps. Officers and enlisted men belonging to batteries of the Coast Artillery Corps which, upon recommendation of the Chief of Coast Artillery, have been classified for the year by the War Department as 'excellent' in service target practice will wear the insignia indicating such classification on the middle line of the outside of the cuff of the right sleeve of the service coat, two inches from the bottom end of the sleeve."

The regulation was necessary both in the interests of morale and efficiency. The wearing of the "E" on the sleeve as a result of the Coast Artillery district commander's rating had led to lack of uniformity of standards. Only a central War Department agency charged with the analysis of all Coast Artillery practices can determine the basis for classifying units on accomplishment under their primary missions. The old system whereby local commanders determined who should wear the "E"

resulted in some units wearing the “E” and, when the computed results of the year’s work were published, it was evident that those units had not attained the average expectancy in speed and accuracy of fire for the armament manned, while some other units, not rated so highly, had not only reached but exceeded expectancy. This resulted in embarrassment instead of pride to those authorized to wear the “E”, and in resentment and a feeling of injustice in units making a higher qualification in their primary mission but not so authorized.

Prior to the World War all units were classified in the War Department, and the Knox Trophy for excellence in gunnery was awarded the unit attaining the highest classification. Following the World War many different types of artillery were assigned the Coast Artillery and a uniform system, just to all, could not be adopted until the expectancy of the new armament in accuracy and speed at varying ranges under target practice conditions could be determined as it had been, prior to the war, for sea-coast guns. The donors of the Knox Trophy were therefore notified and the annual award to the Coast Artillery unit of most outstanding excellence was discontinued. There has been determined a classification system in which the accomplishments of all organizations are compared and the annual award of the trophy has been resumed. But the work of comparison must be centralized since the rapid advances in new matériel make it necessary to determine the classification factors for each year after all target practice reports have been received and analyzed. Otherwise it seems practically certain that units manning armament undergoing improvement will have an undue advantage and that class of armament win the Knox Trophy each year. For the desired morale effect all competitors must feel their chances equal.

In doing this there was no idea of curtailing in any way the District Commander’s function in rating his own units. It is appreciated that, while delivering an accurate and rapid artillery fire on moving targets is the primary mission of the Coast Artillery units, there are many other activities of importance in the command relation of district commanders and their units; some of these, such as tactical exercises and upkeep of matériel having a direct bearing on artillery efficiency—others, such as small arms firing, ceremonies, and interior economy, having an indirect bearing as they affect the general efficiency of units and individuals. The district commanders should rate their units in accordance with a system deemed best suited by each to his own problems.

Prior to the World War, when all units were classified annually in the Office, Chief of Coast Artillery, and the standings published in a War Department bulletin, the Corps as a whole, in hits per gun per minute, compared quite favorably with the naval battleship practice.

With the necessary discontinuance of the War Department classifica-

tion the keen competition between batteries disappeared. District commanders varied in their standards, some giving great weight to exactness in solving adjustment problems, some to solution of tactical problems and exercises, some to smartness in service of piece and hits in practice, some to ceremonies and interior economy. The Corps as a whole deteriorated in practical gunnery (H. G. M.) under service conditions. With the return of a comparative scoring system increased interest and marked improvement has been had. A study of pre-war records, as well as those immediately after the end of the war, shows that today the general average, when the results of all firing batteries are considered, far exceeds what was the average during either of these periods. The average rate of fire for any caliber of gun exceeds the rate of fire obtained fifteen or twenty years ago; the average ranges at which target practices are now held are nearly twice the average ranges at which target practices were conducted; the H. G. M. practically equals former records even considering the great increase in range. Often we hear told glowing accounts by some older officer of what a wonderful shooting battery so and so had and details of how rapidly the guns were fired as well as the large number of hits obtained. Just as good and in many instances better records are now being made. The situation has been reached where it is very doubtful if much better results can be made than are now being had in individual cases. The goal to strive for in H. G. M. is to bring the general average up to what is being obtained in the exceptionally good shoots. This, it is believed, can be done if the improved technical training in fire adjustment now common and the scoring system are adhered to and fully developed. As an example statistics indicate that during the year 1928 the following improvements over 1927 in gunnery were made:

87% of the units fired at increased ranges.

58% of the units obtained increased accuracy.

98% of the units obtained increased rate of fire.

79% of the units obtained an increase in hits per gun per minute.

The classification of all batteries by the Chief of Coast Artillery, being necessary to a common standard, is an essential feature of the competitive system.

It is appreciated that under existing regulations no provision is made for the War Department classification of headquarters batteries, bands and mine planter detachments; neither is there any classification of various caretaking detachments, or school troops. It is not practicable nor necessary that such a classification be made of these units. The purpose of classifying batteries is to give an incentive for improving the work of the Coast Artillery as a Corps in its primary mission of obtaining the maximum number of hits per gun per minute.

The course in Advanced Gunnery now given at the Coast Artillery

School for specially selected graduates of the Battery Officers' Course is providing a reservoir of specially trained gunnery officers in the Corps. The course that is given these officers prepares them to perform the duties of gunnery officer in any organization. They are particularly well qualified for such a position on artillery district staffs. In order that officers taking this course may have detailed knowledge of the manner in which firing tables are constructed as well as some knowledge of ballistics, arrangements have been made whereby they receive a month's course in the Ballistic Section at the Ordnance Proving Ground at Aberdeen. At the conclusion of this time they are employed as statistical officers during all the antiaircraft firing tests that are held annually at Aberdeen. At the conclusion of these tests they report to the Coast Artillery School for the instructional work that they are to have there. Upon the completion of their academic work they have a tour with the Navy during their fleet target practice. Upon the completion of this duty they report to the Gunnery Section in the Chief of Coast Artillery's office for a period of from a month to six weeks' duty in studying the results of target practice and special research work in problems connected with gunnery.

The prescribing of instructions with reference to target practice in great detail has certain disadvantages. By so doing the hands of local commanders are tied and very little discretion or initiative on their part is left. Every attempt has been made to obviate this, but it is difficult, for often questions of minor consequence are submitted in official communications for decision. The result is that the final decision has then to be made applicable to all. Again regulations of a very specific nature have to be drawn so as to prevent some from taking an unfair advantage in order to obtain a high score. A compliance with the spirit of the regulations never brings forth any criticism. Furthermore, most open questions have been left so for decision by the local commander.

Fast-moving targets are the greatest need in the Coast Artillery at the present time to improve gunnery. H. G. M. on an 8-knot target are not the same as H. G. M. on a 25-knot target. The Navy Department has recently designed and built for test by the Coast Artillery a target capable of being towed at a speed of thirty knots. Unfortunately this target sinks when going at a speed of eight or ten knots. Changes are being made in the present design and it is hoped to have available within the coming year such a target for use in testing the ability of existing fire control equipment to function when used against a high-speed target.

The awarding of the Knox Trophy for excellence in target practice was resumed in 1927 by the Massachusetts Society of the Sons of the American Revolution. This award is made about the middle of January each year at the annual dinner in Boston of this society. At the time of the award it is not possible to have all target practice reports for the previous calen-

dar year reviewed and the winner of the trophy determined. This has resulted in making use of the results of target practice for the second year preceding. For instance, the award made in January, 1929, was based on the target practice results for the calendar year 1927. The changing of the target practice year to conform to the fiscal year will permit of the award being based on the previous year's results. The organization awarded the trophy in 1930 will be based on the firings held in the calendar year of 1928. The award in 1931 will be based on all firing held from January 1, 1929, to June 30, 1930. The determination of this award is one of the most difficult problems that confronts the Gunnery Section. Unfortunately there are not several trophies of equal value—one for anti-aircraft guns, one for tractor artillery—one for anti-aircraft machine guns—one for anti-aircraft searchlights and one for fixed and railway artillery. Such trophies are badly needed.

A new gunnery training regulation for Coast Artillery, except anti-aircraft, is now in the hands of the public printer. This will be available some time in the near future. The new anti-aircraft gunnery text is being brought to a final conclusion.

In general four years will be the limit of continuous service in the District of Columbia. Commencing July 1, 1930, officers who have had four years' duty in the District of Columbia will not be eligible for duty as student officers at the Army War College, the Army Industrial College, or for any other detail in the District of Columbia.

In computing service on July 1, 1930, time at the Army War College or any other service school in the District of Columbia will be included as part of the four-year tour.

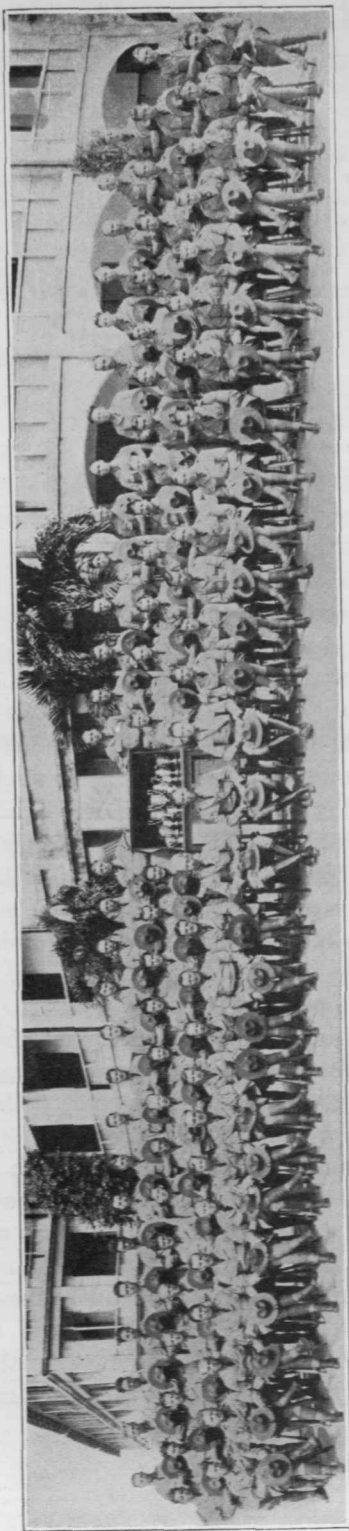
"B" Battery Does Its Stuff

By CAPT. WILLIAM C. BRALEY, C. A. C.

EDITOR'S NOTE: *In a letter transmitting this article to us Captain Braly writes, "I wouldn't have written it except that you asked for it, so it's all your fault." We admit the blame with no apologies. To relieve Captain Braly of all embarrassment upon seeing his name in print we ought to tell how it happened. One day while browsing through the Chief of Coast Artillery's office looking for copy but convinced that there was no more in the world, it occurred to us to look up the records of Coast Artillery target practices and see if we could find one of exceptional excellence. Among others we came across the practice of Battery "B", 59th Coast Artillery. From the results obtained it looked as if the battery commander might know something about firing a Coast Artillery target practice, and we hoped that he might be persuaded to write about it. Upon our insistence he wrote the following article. He admits that Lady Luck was pulling for him, but he claims no legerdemain nor does he pull out any pet gadget and say, "The good results obtained may be ascribed to this little device which I will now describe to the extent of three or four pages or until stopped." There may have been some luck, but you can't laugh off that H. P. G. P. M. of 1.867.*

I AM not sure that the preparation for the target practice I shall describe was in any way particularly noteworthy. Many of the things we did were such routine matters as to be generally accepted as simply "common sense" although, as someone said, none too common. The actual conduct of the firing varied somewhat from the most frequent procedure. However, the combination of preparation, execution and "Lady Luck" was such as to produce rather exceptional results and it was thought a brief narrative of the practice might prove of interest to readers of the Journal.

On account of the large annual turnover in personnel which prevails throughout the Corps we firing battery commanders are faced each year with the task of largely rebuilding our machines for the target practice season. Battery "B" of the 59th C. A. at Fort Mills, P. I., was no exception. Most of the outfit, even the noncommissioned officers, were still in their first enlistment when the artillery intensive training season began last November. The main idea was to use each man of the ninety available to the best advantage, looking toward *more hits per gun per minute*. Round pegs in square holes meant failure and discouragement and it took several weeks of trying, cutting and fitting before we were satisfied with our manning table. As an example, short, stocky men were picked for the shot trucks; men heavy enough to handle them and short enough to duck out swiftly and easily under the rammer when clearing a truck from the breech. Also we found that whenever an operator of a device could be trained to record his own data we eliminated many errors occurring with separate recorders. This was particularly true in the case of observing instrument readers and plotting board arm setters. Our readers usually had all but the last figure of each reading recorded before the bell tapped. A few shifts were made from time to time in order to even up the ability of the two gun sections, speed up some particular operation, or gain greater precision in another.



BATTERY "B" 59TH C. A., FORT MILLS, PHILIPPINE ISLANDS, CAPT. WILLIAM C. BRALY, C. A. C., COMMANDING

This is the outfit that fired the practice described on the following pages. It is unfortunate that the photograph had to be reduced to such an extent that the illustration fails to show what a fine-looking bunch of soldiers this is. Other officers of the battery are 1st Lieut. M. H. Zwicker and 2nd Lieut. P. W. Shunk.

Our assigned armament was Battery Crockett, consisting of two 12-inch disappearing carriage rifles. This battery having been out of service for some time, a great deal of work was necessary to put it in shape. We decided to use a horizontal base for spotting as well as for plotting, so equipped two duplicate base lines. Observing instruments in the base end stations were used for plotting, while azimuth instruments on top of stations served for spotting. Two Whistler-Hearn boards and the necessary telephones completed the hook-up. The plotting board was in the plotting room, of course, while the spotting board was installed in a vacant space on the floor below.

During drill, base end azimuths and gun arm ranges to target were recorded each bell *at both boards*. Upon completion of any course a comparison immediately revealed even small errors which were then checked back to the culprit. The best feature of this arrangement, however, was that when on bell after bell, the gun arm ranges coming up to the B. C. station from the two boards were right together or perhaps five or ten yards apart, *I knew* I was getting accurate ranges, a most comfortable feeling I assure you.

I need hardly mention such things as clinometering the guns, bore-sighting, blending powder, etc. Suffice it to say that we took nothing for granted but performed each detail of preparation with meticulous care.

Rivalry between the gun sections was keen. Day by day some short-cut would be discovered by one crew or the other to clip a fraction of a second from the loading time. Useless movements and commands were done away with. In general, a methodical arrangement of work was striven for in order to minimize both waste and fatigue.

A word now as to the men themselves: We were fortunate in having an excellent barracks and mess, which I believe is a positive asset in any undertaking involving mind and muscle. Frequently the battery officers made short talks of friendly encouragement to the men. They were told in detail what we were going to do. Sometimes a word as to what some of the other batteries were doing served as a spur toward increased effort the next day. Throughout the months of preparation the idea was inculcated that a fine record practice was the ultimate goal so that on the morning of the shoot each man felt that this was the climax toward which he had been working and that the success of the battery depended on his own efforts. If there was any nervousness it was not apparent. (I will say that I sent my wife to Manila for the day.) As this battery team had a few days previously fired both a Battle Practice and a Preliminary, this made their third shoot together. It made the sixth consecutive practice for the three battery officers functioning with myself as Battery Commander, 1st Lieut. M. H. Zwicker as Executive Officer (in charge of firing sections), and 2nd Lieut. P. W. Shunk as Range Officer, a rather unusual coincidence in the service. Mutual confidence seemed to be in the air.

Each unit had shown us that it could function at top speed with precision. Morale was high. It was a game we were playing and all were keen to win.

Perhaps you have heard of that friend of mine who decided to break all records by shooting out at the extreme range of his guns. To use his own words after the practice, "About all I broke was a part of the recoil mechanism, tied up the gun for twenty-four hours, and just about ruined the practice; so learn about ranges from me and don't go out any farther than you have to." We decided to try to get our record shots off at around fifteen thousand yards or a little under.

The towing vessel (Mine Planter *Harrison*) having attained a range

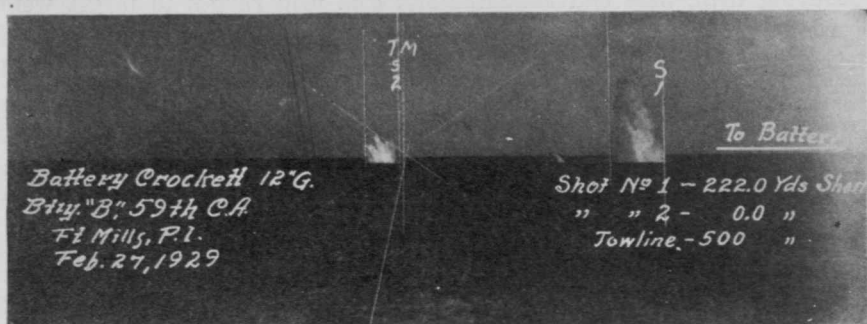


FIG. 1

of sixteen thousand five hundred, "COMMENCE TOWING" was ordered. With all observers and both guns tracking the pyramidal target, *No. 2 being loaded and in battery*, my command was "POSITION OF TARGET ON NEXT BELL WILL BE TRIAL SHOT POINT." On the bell everyone halted and read the azimuth, the target meanwhile continuing merrily on its way. The corrected range was set in about ten seconds and taking a megaphone I stepped to the door of the B. C. station to command, "NO. 2, FIRE FOUR TRIAL SHOTS; FIRE WHEN READY." The first three words was as far as I had gotten when ZOWIE! went the first trial shot. Zwicker was on the job all right. Three more trial shots were fired at this point in rapid succession.

As soon as data on the fourth splash had been reported the base end observers commenced tracking the target again while my B. C. observer measured the travel. Shunk and I then checked each other on our computations for range correction and initial deflection. These were sent to the plotting room and guns and "COMMENCE FIRING" ordered.

The second shot was a direct hit, overturning the target, while the fourth shot, twelve yards short, plowed through the wreckage, completely demolishing it. Both were double hits, of course. (Broadside and bow-on targets).

"CEASE FIRING" was ordered but did not reach the guns until the

fifth and sixth shots were on the way, one of which proved to be a bow-on hit. So far, so good. Six shots, five hits—and the target destroyed. There happened to be two master gunners on the towing vessel that morning and

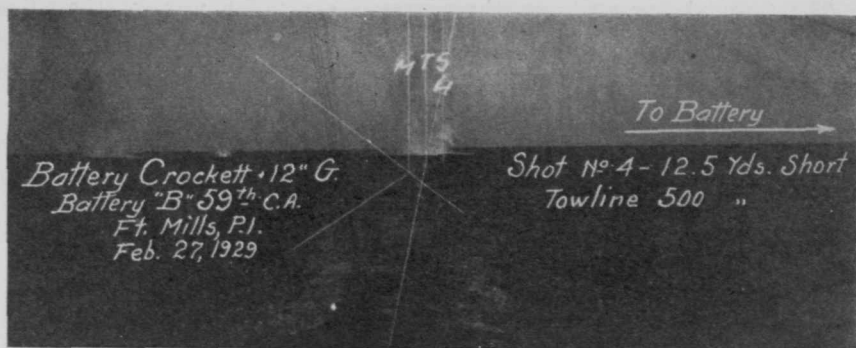


FIG. 2



FIG. 3

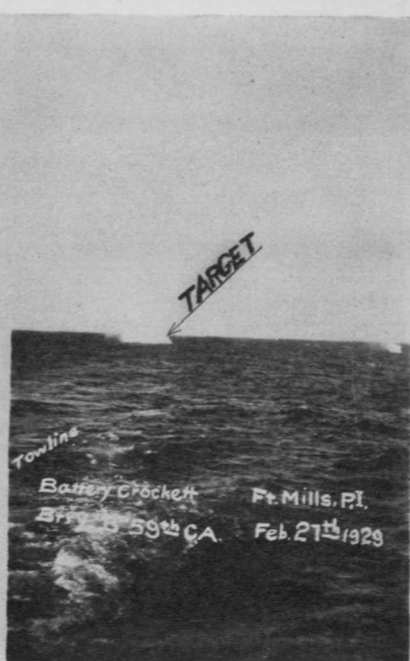


FIG. 4

while one was taking the official photographs the other snapped the kodak pictures here shown.

A delay of nearly three hours then ensued while the *Harrison* went in after a new target and returned to the course. Meteorological messages were obtained each half hour and the changing wind noted particularly. During this interval the men chatted easily at their stations. I visited

each group in turn, complimented them on their work, reminded them that the job was only half done, explained our plan for the work ahead, and urged them to renewed effort when the whistle blew.

The target being again on the course, a correction was set (based on the center of impact of the first six shots and the latest meteorological message) and the remaining six shots fired. The men and the guns responded to the tune of *five more* hits, thus putting the practice across with a bang. Some of these pictures are shown here. The tug officer stated the eleventh shot rocked the target and he thought this one was gone, too, but it finally straightened up.

Attention is invited to the photograph of the last shot (No. 12) with

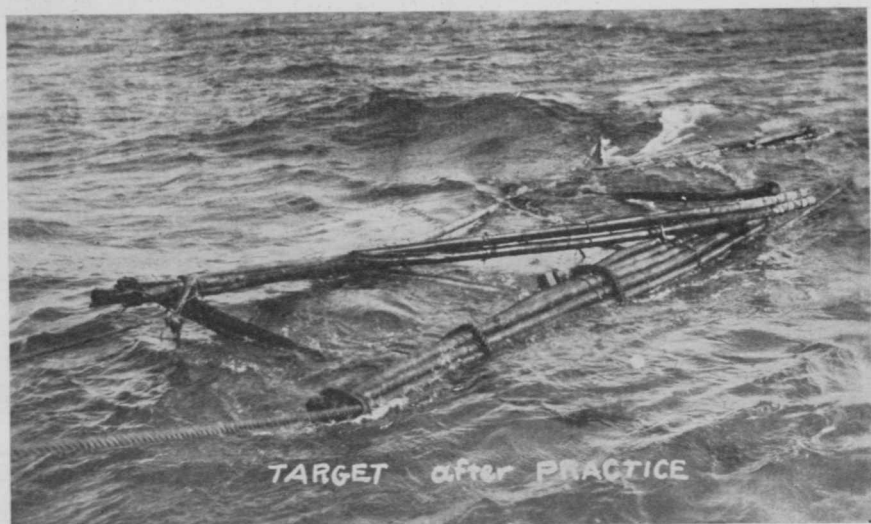


FIG. 5

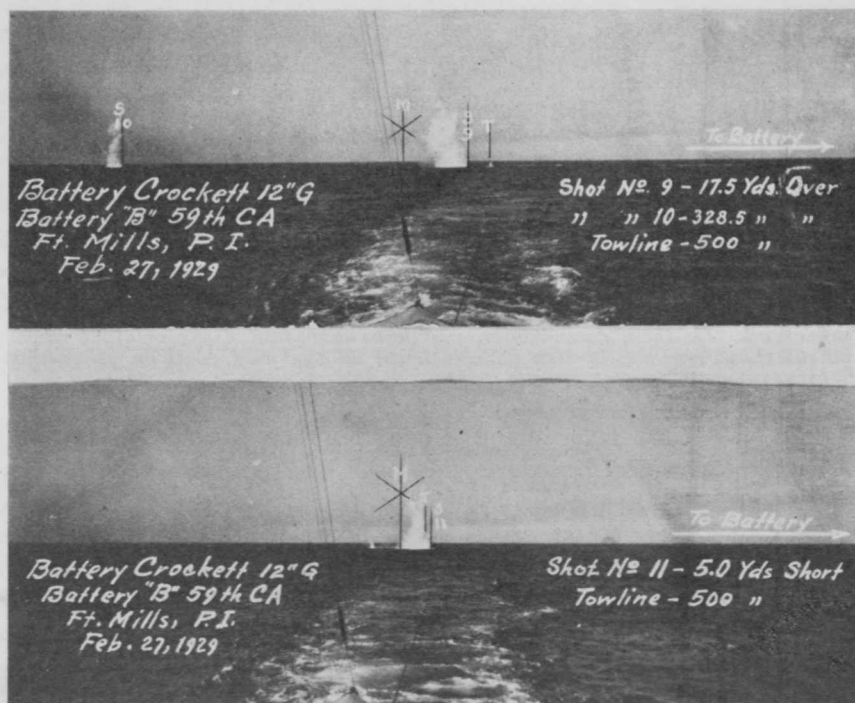
particular reference to the ricochet. While under the regulations no credit can be claimed on this shot, it is apparent from the photograph it would have been a destructive hit on both broadside and bow-on targets.

The excellent work of the gun pointers is indicated by the small D. A. P. E., in direction, of five yards, which was two yards *under* the firing table probable error for this range.

There were no primer failures, no hang-fires, no misfires, in fact, no failures of matériel whatsoever. The only time out was that while waiting for the second target. The rate of fire shown below for the gun sections appears to have been the best yet attained with this type of artillery. When you remember that during the operations of opening and closing the breech block and going into battery (about fifteen seconds) nothing else can be taking place, you will realize it was a case of "up and at em" for both crews.

The accuracy of all units is reflected in the number of hits and the

absence of errors. It was a most gratifying culmination to several months of hard work and we were all very happy to clean up the guns and "call it a day."



FIGS. 6 AND 7

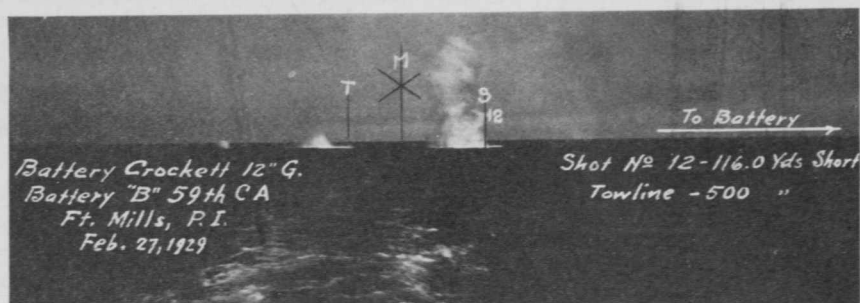


FIG. 8

SUMMARY OF SALIENT POINTS
 Battery of Two 12-Inch D. C. Guns

Rounds fired	12
Hits obtained	10
Average time per round	26.75 seconds
Hits per gun per minute	1.867
Penalty errors	NONE

Recent Developments in Terrestrial Sound Ranging

By MAJ. G. B. ROBINSON, C. A. C.

AUTHOR'S NOTE: *DON'T READ THIS. It lacks dignity. It was written, not to carry a message of light to eager and waiting minds of Coast Artillerymen, but because the kids need shoes; and it was published—if it is published—because there are so many pages that have to appear to be filled with something.*

It lacks erudition. There is not a single mathematical formula in it, not even a Greek letter. (There are several sets of formulae on hand, all in good condition, many from foreign countries, and no duplicates. Prices are reasonable. Those interested should communicate directly with the Author.)

It lacks general interest. Aside from the few officers now and formerly connected with terrestrial sound-ranging activities, which officers do not need to read it, who has any interest in the quaint pastime of locating guns by sound?

It lacks information. The details of recent developments verge upon the confidential. If, then, dear reader, you have disregarded the original warning and all these reasons, it may be mentioned as the final coup de grace that—

It has no sex appeal.

THE well-known team of Speed and Accuracy has been the headliner on the terrestrial sound-ranging stage, but until recently Accuracy has received the attention and applause.

As almost everyone knows, this method of locating concealed enemy guns was developed during the late war and most of the fundamentals of the method are still in force today. On the other hand, practically all the apparatus has been so improved that it has little superficial resemblance to the originals.

The microphones or electrical ears which pick up the sound from the enemy gun are rugged, efficient, reliable and selective. While they remain unresponsive to loud conversation in their vicinity, they will pick up the muzzle wave of a heavy gun even when it is so faint that a human ear in their locality detects nothing. This characteristic helps to keep the records of undesired sounds off the film and thereby simplifies the reading of the record obtained.

Experimentation has determined several types of wire which are satisfactory when used to connect these microphones to the central station or casemate where the records are made, and all these types can be readily obtained in quantity in case of need.

Since there are five or six microphone lines and one or two outpost lines, they are all brought into a central switchboard arranged so that the line sensitivity may be controlled and adjusted to prevailing conditions; so that telephonic communication may be had over any line; so that various tests may be made, and so that conditions may be checked visually by various electrical meters. This present switchboard is compact but with all its parts readily accessible and it is well suited to its work.

The recording apparatus consisting essentially of a timing device, a multiple galvanometer, and a high-speed camera, is a post-war develop-

ment in its present form and because of its ruggedness, its accuracy, and its high speed, it is far superior to its predecessors. The film is quickly developed, fixed, and dried and forms a permanent record. This film which preserves the story told by the microphones, indicates accurately the time the sound arrived at each microphone and it is this information which, when corrected for the effects of wind and temperature and a plotting assumption and in conjunction with the accurate knowledge of the microphone locations, enables the plotting section to locate the target.

Our present plotting methods are perhaps more greatly different than any of the other portions of the system. They are readily adaptable to any situation, are rapid, accurate, and mechanically simple, and provide either (or both) the grid coordinates of the target or its range and azimuth from the directing gun of a selected friendly battery.

The necessary electrical batteries are a recent type well suited to work in the field as is the engine and generator set used to charge them.

It is both natural and right that the greatest efforts in the past should have been applied to the problem of producing apparatus which would be accurate and reliable not only in the laboratory but in the field as well. It may be said truthfully that notable success has crowned these efforts because our apparatus may now be relied upon to give us results of satisfactory accuracy in the situations which are subject to human control; it is compact and easily moveable; and it will be free from trouble during use except for damage which may be caused by enemy fire.

Under these circumstances, it is easily understood that the time has arrived when more attention can be devoted to the problem of speed. In order that there shall be no misunderstanding of this important point, it is necessary to differentiate between speed of operation, which is the time elapsed between the firing of the enemy gun and its ensuing location, and the speed of occupation of position which is the time between the arrival at a new position and readiness to operate. The present speed of operation is excellent. Although it varies somewhat with the range of the enemy gun, the amount of artillery activity, the degree of training of the personnel and similar factors, it is not an exaggeration to say that locations can now be made in approximately three minutes, if necessary. It will thus be seen that this is no longer a serious problem. The real difficulty pertains to the other speed, the speed with which a new position may be occupied. In order to understand what is involved in occupying a new position, it is necessary to explain in general terms what occurs.

When orders are received to occupy a new position, a map of that area will be studied and from this study the approximate locations of the microphones, outpost stations and plotting room will be determined. Hostile and friendly positions so far as known, the front to be covered, the expected average ranges and the character of the terrain and roads will be considered in this selection. The microphones are generally placed a fixed

distance apart on the arc of a circle and should be located by survey with an error not to exceed one meter in any direction. It is necessary to calculate the grid coordinates of the microphones, the length and azimuth of the three main bases, the azimuth of the normals to these bases, and if it has not been done previously, the proper time interval and wind correction scales in order to adjust the plotting board. The proper grid must finally be applied to the board and oriented and this involves other calculations. A traverse must be run from a known point and this traverse will rarely be less than five miles and will frequently be longer. After the traverse calculations are finished the offset calculations are made for the listener positions and the offsets surveyed. As an accuracy check the traverse should be closed. All the various positions must be wired up and the wire to be laid, including liaison lines, may total twenty-five miles. When the microphones are in place, the wire is laid, the plotting board is oriented and adjusted, and the casemate apparatus is in working order, the organization is presumably ready to range.

It would be convenient to say that it takes just so many hours to accomplish all this, but unfortunately the time necessary depends upon a number of more or less uncontrollable factors. Some of these are:

1. The weather. Surveying cannot be done accurately in a fog or heavy rain due to the accumulation of moisture on the lenses and the poor visibility; heavy snow and, in particular, extreme cold retard the work.

2. The character of the terrain. If there are wide streams, deep marshes, or heavy woods in the path of the survey, the difficulty of the work is greatly increased.

3. The character and location of available roads. If the survey and wire laying may be done to a considerable extent along or near good roads it is a great advantage.

4. The number and location of datum points. If such stations are numerous and near, the work of surveying is greatly simplified but this is rarely the case.

5. The number of men in the organization and their state of training. If the organization is below strength or poorly trained, the results will be less satisfactory also.

6. The amount of interference from friendly activities and hostile fire.

7. The extent of front to be covered.

8. Unforeseeable difficulties such as map errors which might cause the microphones to fall in untenable positions (roads, water areas, buildings).

9. The adequacy of motor transportation.

Finally, to reach a well-defined figure, we lack sufficient concrete past experience under varied conditions; particularly because little attention has been paid in the past instances since the war to the time element. But bearing all this in mind so that its approximate nature will not be forgotten, we know that during the war it took from two to three days,

and since, until recently, no real attempt has been made to reduce this time, it cannot be considered that any improvement in this aspect of the problem had occurred.

When this amount of time is necessary prior to operation it is apparent that there is a limitation of some consequence upon the usefulness of this service. There would have to be a certain degree of stabilization of the warfare which, in spite of its prevalence in the late war, should not be presumed to be a characteristic of future struggles. Of course, it is true that the movement of the heavier artillery which form the normal targets of the terrestrial sound ranger takes an appreciable time from the evacuation of one position to action in another, but for maximum effectiveness it is desirable that our own time should be less than that of the artillery.

It is pertinent to consider what phases of the work are most time-consuming. Although wire laying is one element, the neck of the bottle is normally the work of survey.

In general there are two ways in which this problem may be attacked and these two can be called the radical and the conservative. The radical involves a fundamentally different method of locating the microphones and the elimination of most of the wires. These matters are within the realm of the possible, although they involve much expensive experimentation by specially trained personnel and cannot be brought to a satisfactory conclusion in a relatively short period of time.

The conservative method is to study the entire system in order to devise means of standardizing and simplifying the essential work in so far as possible; to cause work which has been consecutive to become concurrent through proper organization of available personnel, and lastly, to carry on all operations at night as well as during the day.

Such a study has been very profitable all along the line. When standard bases are employed as has been generally customary in the past, it is possible to calculate and construct the necessary tables and scales beforehand. This has been usual, of course, but a new type of standard base has been developed which, without sacrificing any of the advantages of the old base, is much simpler and faster to calculate and operate and is somewhat easier to install. All the calculations can be made in a few minutes, only one time interval scale is required instead of four, and only one wind correction for each shot instead of three. Besides saving time this decreases the chances of error.

The various processes of calculation have been reduced to standard minimum forms. Thus, by organizing the work and providing a standard routine, familiarity breeds facility and accuracy. Accuracy achieved upon the first attempt is important, for errors are costly in time.

By rearranging without increasing the authorized war strength personnel, it is possible to have three wire laying parties, two survey parties,

and a separate computing section. Surveying and wire laying have been done concurrently in the past, but with only one wire party, one survey party, and no well-defined separate computing section. Under the reorganization plan the two survey parties will work concurrently and should cut the time otherwise necessary nearly in half, while the three wire parties should cut it to less than half. Unfortunately, the peace-time strength permits the formation of only one survey and one wire party and no separate computing section.

Means have been devised to continue all operations at night. This development has been of great importance since it immediately cuts the total elapsed time in a given case practically in half or, put more accurately, it doubles the available time. This produces subsidiary advantages since the total average delay due to bad weather is lessened and the shorter the time involved the less will be the strain upon the personnel due to continuous effort, that is, if the total required time is sufficiently reduced there will be no time lost through exhaustion of personnel.

While a detailed description of methods, apparatus, and results is properly the subject-matter of official reports, it may be said that it is no longer valid to discount the usefulness of terrestrial sound ranging with the charge of inflexibility which was its only serious remaining disadvantage.

The Secretary of War has issued instructions to all Corps Area Commanders that, whenever air units engage in air maneuvers or participate in air-ground maneuvers, or command post exercises within their Corps areas, a suitable number of officers of other arms of field grade, under the control of the Corps area commander, who volunteer for such duty, will be attached to air units for duty as observers during the period of the exercise.

This action was taken as a result of the observation of the air-ground maneuvers recently held in the Fifth Corps Area. From these maneuvers it was apparent that a more detailed knowledge of the tactics and particularly of the operation technique of air units, is needed by officers of field ranks of the other arms of the service. It is considered that the best method of imparting such knowledge is by the attachment of field officers of other arms to air units during maneuvers or exercises.

The number of officers who will be so detailed will be determined by the Corps Area commander, after consultation with the commander of the air units engaged, and will be governed by the size and scope of the exercise, the number and type of air units participating, and the availability of suitable officers volunteering for this duty.

Notes on the Conduct of the Defense by the Fourth French Army on July 15, 1918, and on the Employment of the Corps Artillery in the VIII French Corps

By MAJ. F. P. HARDAWAY, C. A. C.

(NOTE: The writer commanded a battalion of railway artillery assigned to the VIII Corps during this defensive and so received all orders issued by the Corps relating to the employment of the artillery as well as numerous other orders relating to the defensive dispositions in general. All statements of fact in this article relating to the dispositions and employment of troops are, with a few exceptions, taken from original documents received at the time. It has been possible to confirm a few of these statements by reference to the German Offensive of July 15, 1918, published by the General Service Schools, Fort Leavenworth, Kans.)

GENERAL

THE fifth and last German offensive of 1918 was launched on the night, 14-15 July, on a 90-kilometer front on both sides of the Mountain of Rheims against the Fourth Army of Gouraud on the east and the Fifth Army of Berthelot on the west. Counting reserve divisions of all echelons, the Germans had fifty-five divisions available for the attack.

DISPOSITIONS FOR THE ATTACK

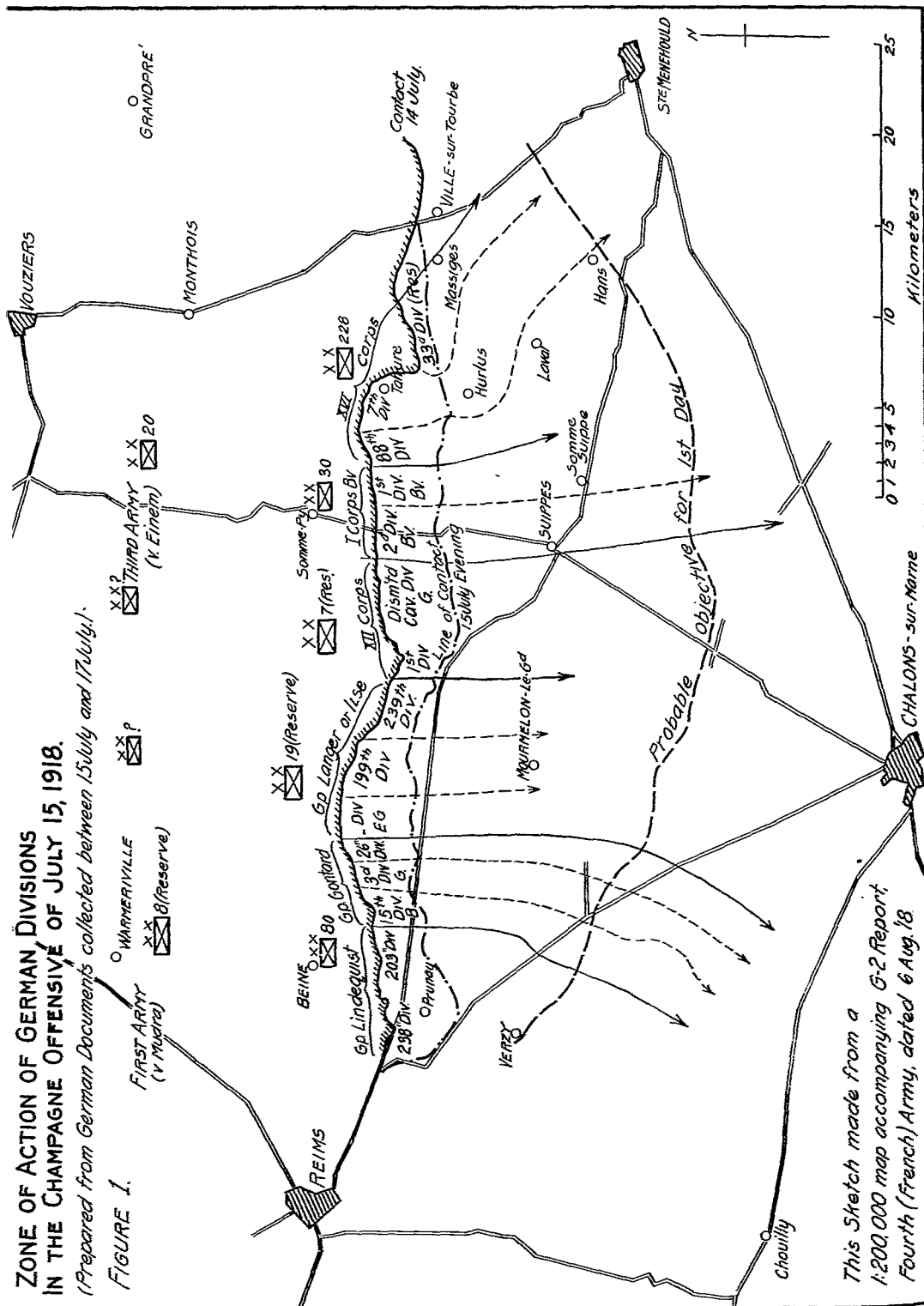
Against the Fourth French Army on a front of about 50-kilometers, the First and Third German Armies attacked with fifteen divisions in front line and about ten in Corps or Army Reserve. The German order of battle on the front east of Rheims opposite the Fourth French Army is shown in Figure 1.

It would appear that the average frontage per front-line German division was about three thousand meters with only about fifteen hundred meters for those divisions close to the axis of the main effort. It is likely that the German divisions averaged only about half the strength of our present war strength division. Nevertheless, it is quite evident that the depth of deployment was sufficient for a very strong attack.

DISPOSITION FOR DEFENSE

The Fourth French Army was disposed with three Corps abreast, the VIII, XXI, and IV in order from right to left. The VIII Corps, with the widest sector had four divisions in line and the other Corps had three. These dispositions are shown in Figure 2.* In addition to these ten front-line divisions there were, in the Fourth Army several divisions in reserve (including the 42d Division, U. S.), but the documents in my possession

* The sector boundaries shown in Figure 2 are in some places only approximately accurate.



do not show the exact number nor which were in Army and which in Corps reserve.

The front-line divisions in the VIII Corps were the 63d Division, 1st Cavalry Division (dismounted), 16th Division, and 161st Division in order from right to left.

The frontage per division in the Fourth Army averaged about fifty-four hundred meters though divisions opposite expected main efforts had a more restricted frontage. These French divisions probably averaged from two-thirds to three-fourths the strength of our present war strength division. It would appear, therefore, that while this front was strongly held, the front-line divisions could not have occupied much wider sectors without materially weakening their defensive strength.

The Fourth Army's defense of its sector on July 15th has since been considered to be one of the best examples of the so-called "elastic" defense which was developed during the latter part of the war and which seems to be the basis for our own present scheme of defense. Briefly, the scheme was to hold the first or outpost position lightly with the bulk of the troops occupying a carefully selected and well-organized position (main battle position) farther to the rear. The outpost troops were to give notice of the attack, delay the enemy, and disorganize his formations as much as possible and the troops on the rear position were to meet the partly disorganized enemy on ground selected in advance by the defender with a view to stopping him and, by counterattack, driving him back.

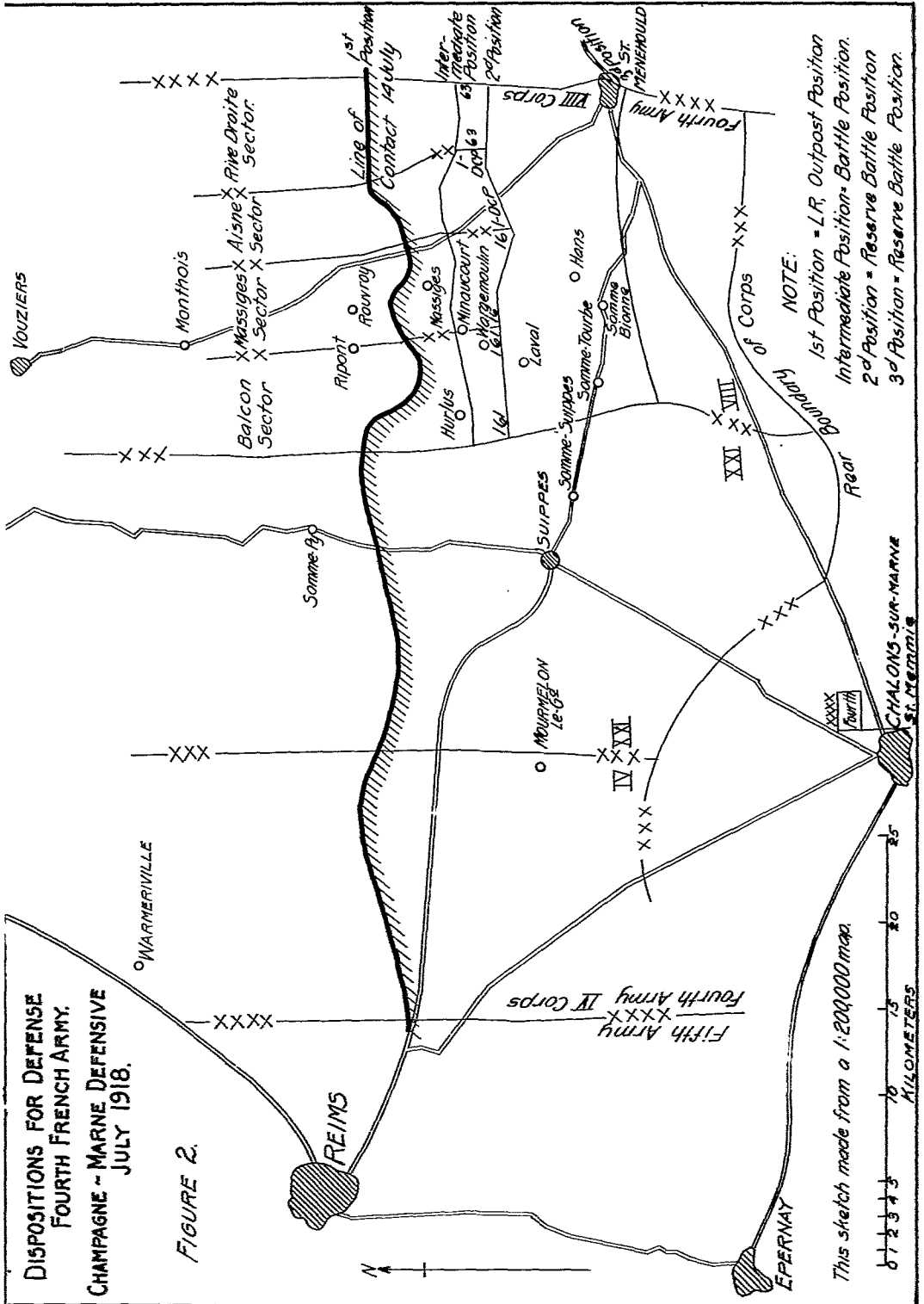
The Fourth Army, in putting this general scheme in effect, had organized four positions over at least part of its front. The position nearest the enemy was called the 1st Position. It, of course, corresponds to our outpost position. The next position was called the Intermediate Position.

Actually, it was the main battle position. The other two positions called the 2d and 3d positions corresponded to reserve battle positions. The 2d Position was, I believe, partly organized and lightly occupied, while the 3d Position was apparently partly organized but not actually occupied. At least, this seemed to be the situation as far as concerned that sector which was defended by the VIII Corps. These positions, referred to above, are shown in Figure 2 and also in Figure 3.

In the VIII Corps, the distance between the Intermediate Position (battle position) and 1st Position (outpost) varied between twenty-four hundred meters (about twenty-six hundred yards) and six thousand meters.

The 2d Position (reserve battle position) was about twenty-five hundred meters in rear and the 3d Position about sixty-five hundred meters in rear of the 2d.

Very definite orders were issued by the Fourth Army and subordinate echelons specifying the rôle to be played by the troops in the 1st and



COMMANDING GENERAL, VIII CORPS

CORPS CHIEF OF ARTILLERY

COMMANDER OF THE HEAVY ARTILLERY OF THE CORPS

Group Hardaway, II/53 (US) 19-cm. railway guns			
	<i>Valmy Groupment</i>	<i>Brauc Groupment</i>	<i>Somme Tourbe Groupment</i>
Group Dussand, I/108 105-mm. guns	Group Toulon, I/86 155-mm. G. P. F's Group Gyrard, I/285 155-mm. guns	Group LaNevre, I/453 105-mm. guns Group Vautier, I/281 220-mm. mortars Group Pradal, VIII/II 155-mm. and 120-mm. guns Group Lefebvre, I/421 155-mm. guns Group Harranger, VII/II 155-mm. and 120-mm. guns Group McCain, II/44 (US) 8-inch Howitzer	Group Guionon, II/453 105-mm. gun Group Bureau, IV/2 120-mm. gun Group Madec, III/108 155-mm. gun Group Garrett, I/44 (US) 8-inch Howitzer

NOTE: All organizations except those marked U. S. are French.

Intermediate positions. It may be of interest to quote an extract, as follows:

Fourth Army Order: "The enemy must be stopped at the Intermediate Position, and no one, under any circumstances, is authorized to order a withdrawal from this position."

This sounds like the precursor of the briefer phrase, "The battle position will be held at all costs."

DISPOSITIONS OF THE CORPS (HEAVY) ARTILLERY OF THE VIII CORPS

In the French Army, the organic artillery of the Corps (now as well as then, I believe), consisted of one regiment of so-called heavy artillery (normally six batteries of 105s and six batteries of 155s). This was referred to as the heavy artillery of the — Corps. The 108th Heavy Artillery was the organic regiment of the VIII Corps. In addition, units of Reserve (GHQ) artillery were attached as needed. The Corps chief of Artillery was a colonel (normally a brigadier general) and the commander of the Heavy Artillery of the Corps was a lieutenant colonel (normally a colonel).

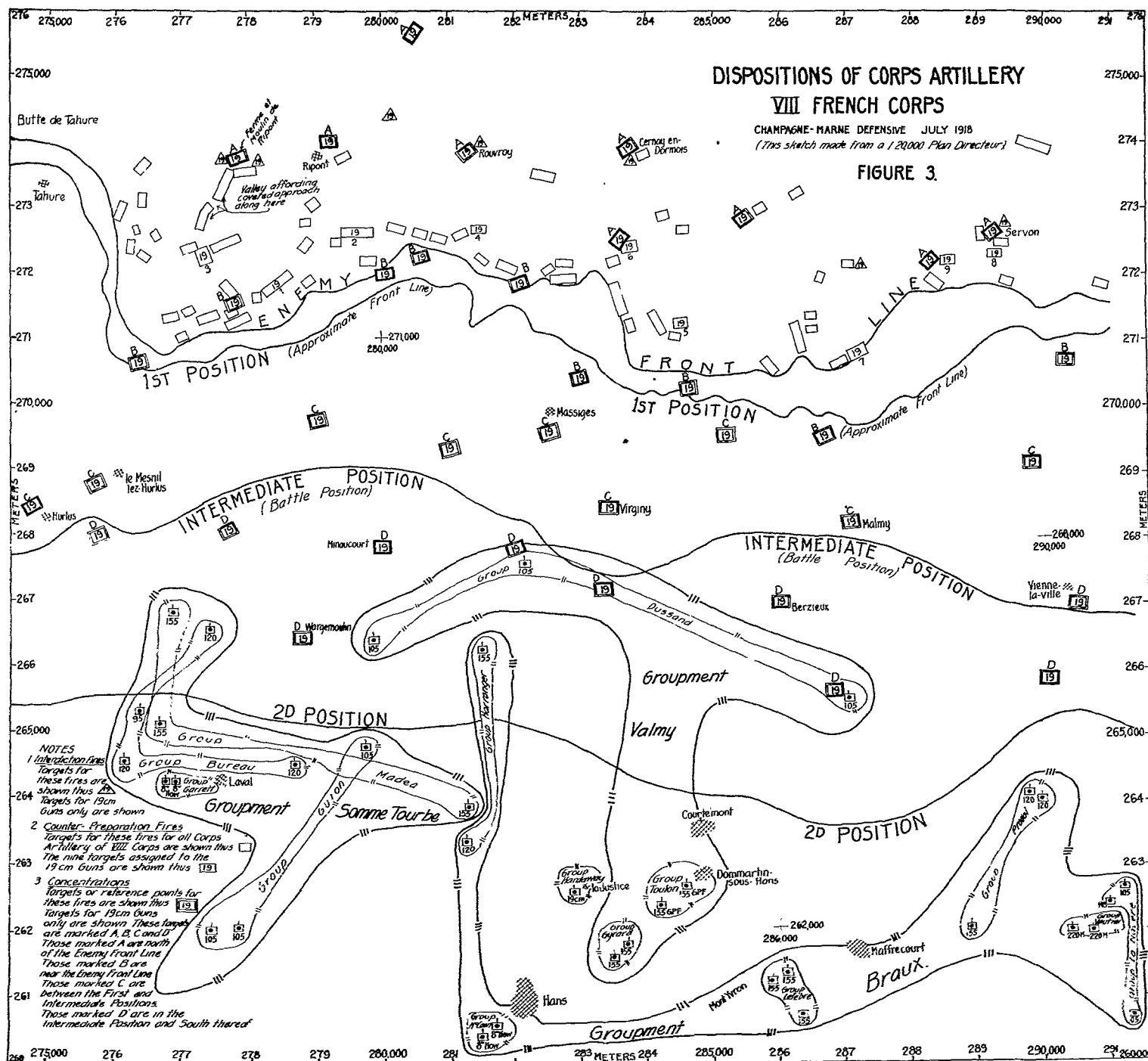
During the early part of June, 1918, the heavy artillery of the VIII Corps consisted of a total of fifteen batteries. This number had grown to thirty-five batteries before the Germans attacked. As additional artillery units were attached from time to time, they were placed in the existing groupments. On July 13th the groupments were somewhat reorganized. There were three groupments, each consisting of from three to six groups and one group retained under direct control of the Corps Heavy Artillery Commander. The general organization is represented by the diagram.

The general location of these groupments with respect to the front line is shown in Figure 3. General locations of groups within groupments have also been shown. It is interesting to note that not only have the groupments been echeloned in depth, but also, in most cases, the groups as well have been echeloned in depth. In fact the echelonment in depth was carried to such an extent that certain groups or parts of groups were located so far to the rear that they could not reach the existing hostile lines. This was probably done with a view to insuring the ultimate availability of the maximum fire-power in front of the Intermediate Position (main battle position) and insuring effective support in the event of a substantial retirement.

PLANS FOR THE EMPLOYMENT OF THE HEAVY ARTILLERY OF THE VIII CORPS

The orders for the defensive fires issued in advance by the commander of the Heavy Artillery of the Corps (in accordance with the plan of the Corps Chief of Artillery) included:

- Interdiction fire
- Counter-preparation fire
- Concentrations.



These were all pre-arranged fires and involved on the part of all batteries the preparation of fire on a very large number of targets many of which were never fired on.

Interdiction Fires.—These fires were prepared for several targets in two areas and were to be opened on receipt of a telephoned code word (one for each general area). They were to be fired in accordance with a pre-arranged time schedule, fire being shifted to the previously designated target at the end of a given period. Targets for these fires for the 19-cm. guns only are shown in Figure 3.

So far as I know, these fires were not employed though, of course, other harassing and interdiction fires were fired nightly, mostly from special positions or by roving guns. At any rate these special interdictions were not fired by the battery in my* group. However, this battery would not ordinarily have taken part in any interdiction fires as it had been designated as a silent battery and was not to open fire prior to the general counter-preparation. For the 19-cm. guns, the cadence was to be irregular and the rate one shot per gun every four minutes.

Counter-preparation fire.—Each battery was to prepare firing data on a number of objectives (nine objectives in the case of the 19-cm. guns). The orders relating to these fires were in tabular form, different objectives being carried in columns under code words making it possible to open fire and shift fire rapidly between the objectives by telephoning a code word. For example, the first code word actually sent out was "CPO general" which caused these fires to be distributed over the entire front. Later another code word was sent out which caused the bulk of these fires to be placed on hostile positions in front of the left of the Corps where it was expected the main effort would be made. Actually, the hostile main effort from the point of view of the VIII Corps was made against its left. The counter-preparation fires, though pre-arranged, were to be observed if practicable, but I do not believe they were in any instance.

The objectives for all the heavy artillery of the Corps are shown in Figure 3, but it must be remembered that fire was not directed on all of them at the same time. Probably many of them were not fired on at all (particularly those on the right).

It is interesting to note that most of these counter-preparation objectives were very close to the German front line. On the left, however, the objectives covered a ravine leading to the front from the Ripont farm.

Concentrations.—The targets or objectives for concentrations for the 19-cm. guns of my group only are shown on Figure 3, although all batteries prepared fire for designated objectives. These objectives were not assigned with the idea that the concentrations would be placed on these objectives

* At this time only one battery of my group was supporting the VIII Corps, the other having been temporarily assigned to the support of the XXI Corps on the left.

only, but with the idea that if firing data were prepared for these objectives selected in localities likely to become important, concentrations could be laid down on the objectives actually selected later merely by a shift of fire from the one objective to the other.

In addition, certain units were to fire concentrations in accordance with direct airplane calls for fire. For this scheme, I haven't the details.

The concentrations were to be observed fires.

The 19-cm. guns in my group did not fire on or near any of the designated concentration objectives, but continued to fire on the counter-preparation objectives until 7:20 a. m., July 15th. This was probably because the slight advance of the enemy did not require a shortening of the fire of the heavier calibers, such as the 19-cm. guns, whose counter-preparation fire had in reality merged into defensive concentrations without change of target.

Counterbattery fires.—The plan contemplated that when the hostile attack began, no counterbattery would be attempted, all artillery being concentrated on the hostile infantry. This was covered in an order issued by the Corps Chief Artillery, an extract from which is as follows:

“II. A. 3. From the time the signal is given that the hostile infantry is marching to the attack, all artillery, light and heavy, will concentrate its fire on this infantry (Note No. 957/3 of 6 March from the general commanding the Fourth Army) and the neutralization of batteries will be suspended on the front of the attack. The divisional artilleries will continue to keep the heavy artillery groupments informed and to ask for their support. The (lieutenant) colonel, commanding heavy artillery of the Corps, will constantly strive to reinforce the fires of the divisional artilleries and to organize other concentrations by such units as may be available.”

CONDUCT OF THE DEFENSE. (BASED ON G-2 AND G-3 REPORTS OF THE FOURTH FRENCH ARMY)

As early as the beginning of June, it had become apparent that an attack would probably be made on the Champagne front. By the end of June it had become a certainty that the Germans would soon launch a major offensive on both sides of the Mountain of Rheims. Information concerning the impending attack and its details were obtained from all sources, but the most important information was obtained from the aviation and from raids. For example, the aviation was able to ascertain that the number of railroad cars in certain stations had doubled and tripled. Night reconnaissances indicated an increased activity in certain bivouacs and cantonments and showed toward what part of the front troops were being sent.

The Commanding General, Fourth Army, had stressed the absolute necessity of conducting raids in order to capture prisoners and obtain other information and within the Corps these orders were obeyed to good

effect. Prisoners were captured on the 28th of June, who stated that an attack on the Champagne front was impending, but did not give the exact date. During the early days of July, prisoners were captured almost nightly from whom increasingly definite information was obtained. Meanwhile, the Army Commander had directed that beginning the 5th of July, all troops would occupy their combat positions between 11:00 p. m. and 3:15 a. m. This included the withdrawal of the outpost troops except for the detachments which were to remain there in strong points and centers of resistance. Finally, on the 14th of July, at about 8:00 p. m., a raid in the sector of the IV Corps secured twenty-seven prisoners from whom information was obtained that the hostile artillery preparation would commence about midnight and that the attack would take place between 3:00 a. m. and 5:00 a. m.

The Fourth Army Commander then at about 11:00 p. m. sent out the code word for the counter-preparation to begin at 11:30^p p. m. As the German preparation did not begin until ten minutes after midnight, our preparation began forty minutes before theirs did and, according to later reports of prisoners, came as a surprise and had a great moral as well as material effect.

The hostile infantry jumped off at 4:15 a. m. The attack was partly disorganized and considerably slowed up by the troops in strong points and centers of resistance in the first (outpost) position. The infantry was preceded by a rolling barrage, but was so slowed up that it fell behind before our Intermediate (main battle) Position was reached.

The enemy reached the Intermediate Position between 7:00 a. m. and 8:00 a. m. where he was stopped on virtually all parts of the front though slight penetrations were made in a few localities which were promptly counterattacked.

By noon of the 15th, it had become apparent that the enemy was definitely stopped though he did not finally give up the attempt for several days. Within a week, the troops had reoccupied the original first (outpost) position. The defense had been entirely successful.

A national desire for peace and good will does not justify us in putting our country at the mercy of other powers which may not have such a horror of war.—San Francisco Chronicle.

The Army with the Navy

By CAPT. HOMER CASE, C. A. C.

WE stood on the searchlight platform on the after-part of the *U. S. S. Pennsylvania*, a hundred feet above the water. Behind her steaming in column at eighteen knots were the six other battleships of the Scouting Fleet. We were just off Gonaives Bay in Haiti on the opening run of the Force Battle Practice. Many miles off to the starboard quarter could be seen several targets towed by a large supply ship on a course parallel to that of the firing ships. To the left of the targets was a division of destroyers standing by to take their place in the problem. Above swarmed many observation and fighting planes that had just been catapulted from the decks of the fleet. Below us the hatches were closed, the decks deserted and an unseen eye kept the turrets trained on the targets.

Suddenly the signal flags fluttered from the yards of the flagship and each ship turned some degrees to the starboard and formed a line of bearing steaming in the direction of the targets. As soon as within range the command to commence firing was sent, the chug of the shells going home was heard, the muzzles came up and the forward turrets of all ships belched forth the first salvo. At this salvo the signal was flown for a change in course and all ships turned to port into column running on a course parallel to that of the targets. Before the turn was completed the forward turrets had fired the second salvo and on the third all turrets could bear on the target and the after guns joined in.

The first salvo was a ranging salvo. The spotters in the tops read the lateral deviations and estimated the range deviations. In an instant more accurate range sensings were received from the observers in the planes who had direct radio connection with the spotters. Adjustment corrections, called "spots," were telephoned to the plotting room, fed into the firing data system and the second salvo was on its way. Succeeding salvos were fired as fast as the turrets could be loaded and laid. Salvos were spotted and "spots" applied to the data whenever the spotter thought necessary.

This process was being repeated all along the long line of ships. One after another without rotation or system the ships bellowed forth their salvos, emitting a cloud of smoke that floated back over the vessels. Thousands of yards off the water was being churned by the landing shells. First one solitary splash would rise, then an instant later the whole salvo would strike, sometimes obscuring the target, sometimes all over and sometimes slipping a few miles off to the right or left. The remarkable thing was the few straggling shots in direction. If the salvo was off the target, all shots were off. It showed remarkable calibration in direction.

Meanwhile the destroyers had been busy. The division had fired a broadside of torpedoes so timed that they would reach the battleship for-

mation just as the turn from echelon into column was taking place. This was as firing was taking place and just at the time of the first "spot" and complicated matters greatly. At one time the ship must make the turn, adjust fire, dodge torpedoes and continue fire without loss of time or accuracy. On one or two of the ships the violent turns necessary to miss the torpedoes threw the gun pointers off the targets on the correct point of the roll and it was necessary to hold the salvo until the ship rolled back again. In addition to firing torpedoes the destroyers had the rôle of interfering with radio communication between ships and planes. Each destroyer sent out a continuous stream of spark in the endeavor to blank out any spotting data sent through. But even though midway between planes and ships their interference did not materially destroy the effectiveness of the aerial spotting.

All these things took less time than the telling. In a few minutes over five hundred twelve and fourteen-inch projectiles had been hurled at the bank of targets and the turret firing was over. The ships steamed on in column, made a wide sweep to port and came back directly at the leading target. When the range had closed to some ten thousand yards the column changed direction to the starboard until it was running almost parallel to and in a direction opposite to that of the targets. On the turn each ship opened fire with port broadside salvos from the five-inch guns as soon as they could bear on the target. Each gun fired ten shots as fast as possible, targets being changed once or twice during the firing. The leading division fired on the leading enemy targets until the second division could bring her batteries to bear when the first division switched her fire to other targets. This facility in changing targets is something of which the Coast has much to learn but which it is learning in our own battle practices.

The Admirals and the Army observers probably saw more of the practice than anyone else. Everyone in the crew had a task to perform and was at his battle station. Even the Supply Officer was out on deck reading and recording the pitch and roll of the ship for inclusion in the target practice reports. The Admirals were on the flag bridge and we kept out of the way of men who had work to do. Our only companions on the searchlight platform were the sailors who manipulated the large clock that always excites the curiosity of visitors. It has a large face numbered from 1 to 0 and two hands, one black and one red. As the ranges are computed in the plotting room they are telephoned to the clocks fore and aft and the black hand sets off the thousands and the red hand the hundreds of yards. This is read from adjacent ships as a check against the range that ship is calculating. Ships haven't the advantage of the precise ranges given by a long horizontal base but must depend on the mean of several coincidence range finders. So a check from ship to ship prevents large errors.

The after mast offered an excellent view of all the ships following and

of the targets, even if we were almost choked at times by the colorless smoke from the funnels. The first full ship salvo was the worst. Two forward salvos had been fired and the turn was about half completed when the after turrets could get on the targets by traversing as far forward as possible. Elevated almost to the highest limit, we were almost looking down the bores—at least we felt so. The full ship's salvo gave the springy cage masts a terrific whip, the blast from the after turrets racked us all over and the hot gases almost singed our faces. It is not as simple as standing behind a battery of disappearing guns.

The material targets used for these firings are really ships that cost some twelve thousand dollars. The target proper is made of one by fours spaced about four inches apart and nailed to heavier uprights. This is carried on a solid raft-like hull. For the Force Battle Practice actual hits on the material target are all that count. Before firing, the bourrelets of all shells were painted different colors for different ships and the color of the edges of the holes in the targets determined the ship that got credit for the hits. One officer from each ship went out to inspect the targets and the hits were tabulated.

For practices fired by single ships hits are plotted on a hypothetical target in a manner similar to ours. But not so simply. We observe lateral deviations from land and have a plot of the course of the target so that a single photograph is sufficient to locate a shot or salvo. But when everything is floating on the water and from eight to ten shots land in a salvo this is not enough. A very elaborate system must be used. One set of moving pictures is taken from the air and another from the towing ship. Then two sets of still photographs are made from the towing ship, one showing the target and overs and another the target and shorts. Some five hundred yards from the towing vessel, one on each side and moving parallel to it, are two camera tugs from which each salvo is photographed. But it is necessary to know the location of the camera tugs with respect to the towing ship. Men on the ship take continuous range readings (with a short range finder) and bearings on the two tugs. With the six sets of photographs and the two sets of range and bearing readings the location of each shot of each salvo can be plotted to a nicety. This is done first by the fleet and then by draftsmen in the Navy Department.

We battery commanders grouse over the complication of our target practice reports, but compared to those in the Navy they are mere "scraps of paper." They take their practices apart and find out what makes them tick—or the reverse. The graphical analysis is actually as large as the top of an office desk, the report is three-quarters of an inch thick and as complicated as a set of double-entry Post Exchange books. The reports are made up by a board consisting of the gunnery officers from all ships of that type in the fleet. With us the battery commander cannot be blamed for sending in a report with the sunny side up, but in the Navy

the ship's gunnery officer can only testify in his own defense. He can make sure that his side is represented, but the presence of other officers with whom he is competing makes it certain that nothing to his disadvantage is left out or slurred over. And nobody feels that too much time is given to analysis. The cost of ammunition alone, not to mention erosion of guns and cost of training men, runs into thousands of dollars for each practice so that everything possible should be learned.

Each practice is scored and there is keen competition between ships. In this score the number of hits is the best index of the value of the practice. In the Navy they get "the long run" by firing from seventy to eighty shots in each practice. "Lucky hits" and "unlucky misses" have little weight—the law of averages takes care of that. But when we fire from ten to twenty shots in a practice and the probability of hitting is small, pure chance often makes a difference between "Excellent" and "Poor." So we properly have given smaller weight to hits and more to accuracy, which is a measure of how far all shots are from the target.

In the Navy no time out is given for matériel failures. If a primer fails it's just too bad. In one case the tube of a gun slipped to the rear on the first shot and after that the "plugman" could not close the "plug." The officer in charge of that gun could not possibly have foreseen this failure, but no time out was given. You might say that this system was not equitable, but they argue as did the father who whipped his little son every time he fell down, whether it was his fault or not. Some one chided the father for his unfairness and received the answer, "You see that Willie has stopped falling down." The *Pennsylvania* fired eighty-four shots from her turret guns without a matériel failure.

The whole system of aerial observation aboard a battleship gives the Army much to ponder over. The planes are combination fighting and observation ships and are launched by catapult. The pilots and observers are ships' officers, stand their watches with the rest of the officers, and are assigned to the gunnery division of the ship. Living and eating with the other officers, they take part in the discussions and plans for the practices and have the point of view of the ship rather than solely that obtained in flying. So that when they are observing they are a part of the gunnery team rather than disinterested helpers who are not thoroughly familiar with the object of the work. This certainly should make a big difference in the work of the pilots and observers, and in the confidence placed in the observations by the officer conducting fire.

The United States military establishment is not permeated with the militarism which existed in Europe.
—Indianapolis Star.

The Snickers Automatic True and False Solver

By the JUNIOR COAST ARTILLERY BOARD

EDITOR'S NOTE: *The following description of a gadget has been submitted by 1st Lieut. Raymond Stone, Jr., who calls himself the Recorder of the Junior Coast Artillery Board. Since we avoid reading any articles about gadgets we followed our usual custom in this case and confess that we have not read this explanation of the "Snickers." The instrument seems complicated enough to satisfy any one. We do not wish to be accused of partiality, so assign some space to the "Snickers." It can never be said that the Editor of the COAST ARTILLERY JOURNAL stifled the embryo genius of any budding gadgeteer. We believe that the Snickers will prove as useful as many other gadgets that have strutted for a brief moment across the stage—in fact, more useful.*

A. ORIGIN

IN the fall of 1928 the Coast Artillery was faced with a post-war problem it found itself unable to solve, namely, the true-and-false type of examination. With laudable promptness the Junior C. A. Board, dormant since 1923, was reorganized and assigned the task of handling the situation. The machine presented herewith is the result of their labors.

B. GENERAL DESCRIPTION

This is truly a remarkable gadget. It can easily be seen that it is a device simple of operation; yet within it are carried on tremendously intricate and delicate mechanical processes. Some of the mathematical relations which are solved mechanically would astonish even an instructor; yet in this admittedly crude trial model backlash has been practically eliminated; weight reduced to a minimum, and amazing results are obtained merely by setting a dial or two and twirling a hand-wheel. The designers have been handicapped by lack of manufacturing facilities and matériel, but nevertheless have produced a gadget that stands head and shoulders above the RA Corrector, the Vickers, and the Ford T-1. Simplicity of manual operation, intricacy of mechanical performance, all-inclusiveness of necessary corrections, accuracy to within .00005, and above all ORIGINALITY OF DESIGN, mark the Snickers as a "different" machine—and how!

C. DETAILED DESCRIPTION

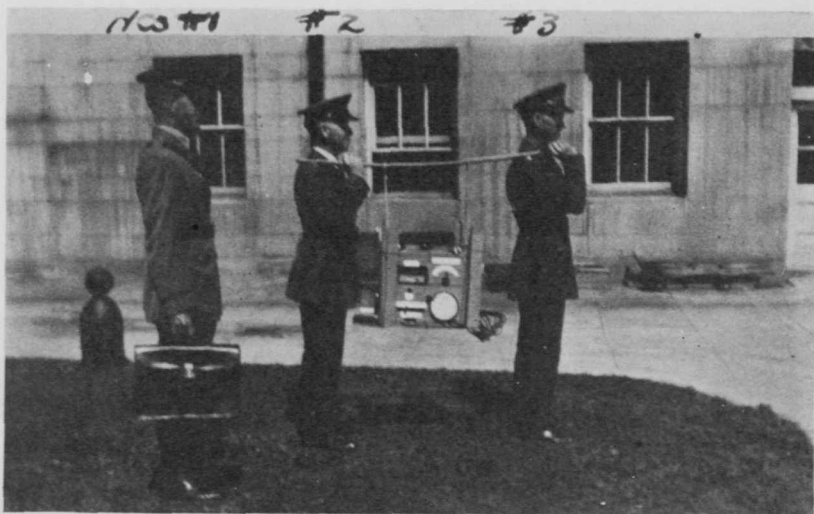
The Snickers is a boxlike affair mounted on three-piece folding legs. It measures about 20" x 11" x 13", and with its legs extended stands about sixty-eight inches high. It weighs about forty pounds, complete with batteries, oil and accessories. It is portable, a carrying bar and rope slings being furnished. It is made of select white pine.

The FRONT FACE has on it the nameplate and shield of the designers. An OIL HOLE permits lubrication.

NOTE: See the accompanying photographs.

The REAR FACE mounts the DISTINTEGRATING HANDWHEEL, which, through a triple set of gears and two inverted cams, breaks down the resistance of the EXAM SHEET when it is inserted in the proper slot. An OIL HOLE provides for lubrication. On a horizontal shelf extending to the rear from the bottom is mounted the ECCENTRIC POINTER DISC, which the operator vainly tries to keep matched with the FIXED POINTER on the bottom edge of the rear face.

The TOP FACE carries the FRONT and REAR SIGHTS, with which the instrument is oriented by getting a line on the instructor conducting the exam. An OIL HOLE is provided for lubrication. The EXAM



SHEET SLOT and NAME CARD SLOT are for the insertion of the firing data named. There are two holes at either end through which the CARRYING SLINGS project. Two OPERATING WHEELS for the "Remarks" scale cylinders are also found on the top face, as well as a patented holder for the OIL CAN.

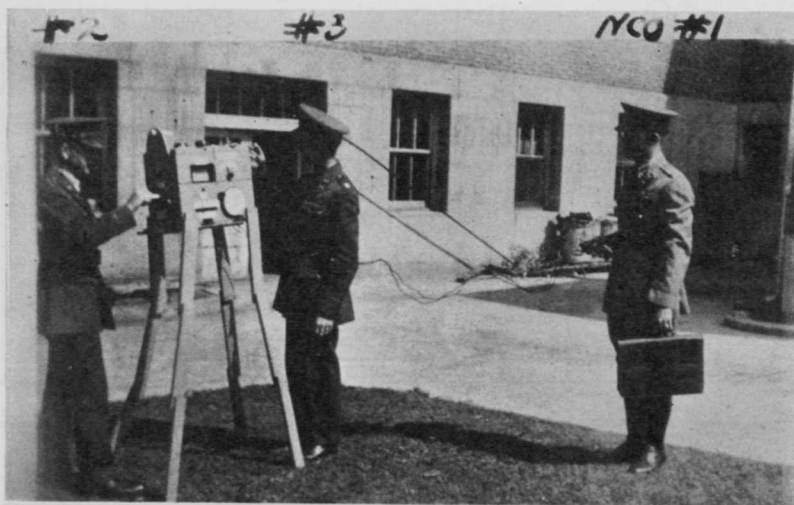
The BOTTOM FACE is hinged, giving access for repairs. It is habitually kept locked, and the key in the possession of the Junior C. A. Board President so that no unauthorized repairs will be attempted. (It cannot be too strongly emphasized that in case of trouble this machine MUST BE FORWARDED TO THE FILL ARSENAL, where the designers, the only ones who understand the gadget, will make the necessary adjustments.) The DISTANT CONTROL WIRES of the T. I. APPARATUS load out through the bottom face.

On the RIGHT FACE are found the "Remarks" window, through which show on a continuous ribbon scale remarks appropriate to the score attained in the test; the TEMPERATURE and ALTITUDE CORREC-

TION-SCALES, the PER CENT DENSITY CORRECTOR, and an OIL HOLE for lubrication.

On the LEFT FACE are mounted the VERY ARBITRARY INSTRUCTOR CORRECTOR DEVICE, which through a system of plugging in varying resistances for the several instructors, compensates for their peculiarities; the MAXIMUM SCORE and PASSING GRADE-SCALES concentric, with POINTER; the SPOTTING CORRECTOR, not yet completely developed; an OIL HOLE for lubrication; the BOX LOCK, and the RESULTS OF TEST APERTURE.

The FOLDING LEGS, attached directly to the box, are secured against



complete collapse during operation by pins inserted in continuous holes bored through leg sections at the joints. In transit the legs are folded vertically along the box sides, and held in place by wires passed around them and the box.

D. MANNING DETAIL

The Snickers crew comprises an NCO in charge, and operators No. 2 and No. 3.

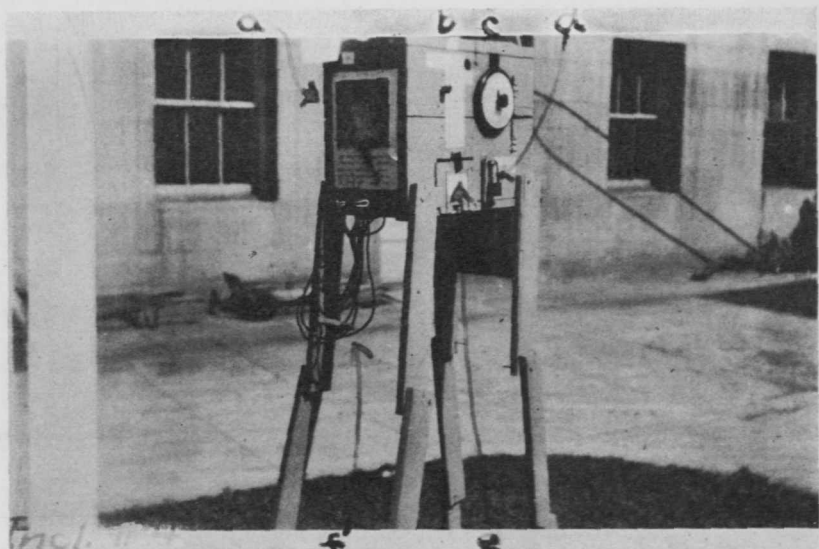
The NCO No. 1 gives the commands for locating, orienting, and preparing the instrument for operation; he runs the distant control and checks the time; makes correction calculations in altitude and temperature, and in general supervises the drill and condition of the instrument. He carries a brief case, stop watch, and firing data.

No. 2 and No. 3 split up the duties of operators. In working around the piece they always proceed in a counter-clockwise direction, to avoid interference. They set up, take down, and carry the instrument, and in general perform the duties contingent upon the commands No. 1 may give them.

E. OPERATION

(1) *Setting Up.* The instrument being slung in "march order," and carried by No. 2 and No. 3, No. 1, picking a suitable location, commands "DETAIL HALT. PREPARE FOR ACTION. No. 2 unlocks and unfolds the legs on the right side, No. 3 those on the left. No. 2 secures the carrying slings as provided for on the top face. No. 3 puts the carrying bar to one side. Both then set up the instrument and secure the legs rigidly with the pins. No. 1 supervises.

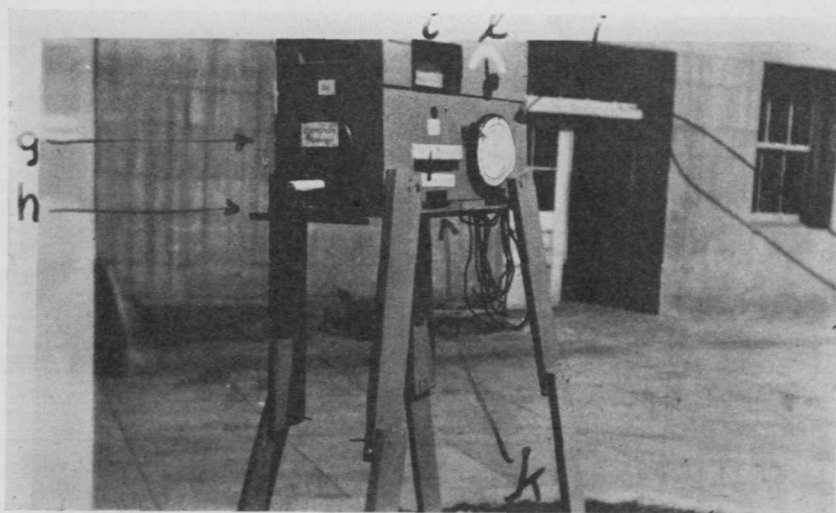
(2) *Testing.* No. 2 and No. 3, without command, test all working parts, reporting to No. 1 any defects.



(3) *Orienting.* The NCO, selecting the instructor conducting the exam, commands ON CAPTAIN SO-AND-SO, SIGHT. He points an accusing finger in the proper direction. No. 2 picks up the instrument and relocates it, directed by No. 3, who mans the sights and makes minor directional changes by means of the adjustable rear sight. No. 3 calls "ON TARGET" when he has the sight trained on the designated instructor. No. 2 then plugs in on the VERY ARBITRARY INSTRUCTOR CORRECTOR DEVICE opposite the instructor designated.

(4) *Preparation.* No. 1 selects from his brief case typical firing data (or data as ordered by higher authority) consisting of a NAME CARD and an EXAM SHEET. He inserts them in the proper slots, calling out for example, "HEWITT—20%," at which No. 2 sets the DENSITY CORRECTOR at 20%, and "BASIC GUNNERY No. 2—50 QUESTIONS," at which No. 3 sets the MAXIMUM SCORE DISC at 50, and calls back to No. 1 the corresponding PASSING GRADE, such as "29." The NCO retorts, "NEXT BELL TIME ONE. STAND BY."

(5) *Actual Operation.* No. 1, after a short interval, presses the T. I. PUSH BUTTON, and starts his stop watch. When the bell rings at the gadget, No. 2 jumps to the rear face, starts the ECCENTRIC POINTER going, and operates the DISINTEGRATING HANDWHEEL at top speed, in a clockwise direction. (In no case may he turn it counter-clockwise, as the entire disintegrating mechanism would be thrown out of gear.) No. 2 also endeavors to keep the pointer matched as described in C(3) above. No. 3 secures the OIL CAN, oils the internal gears through the five oil holes provided, replaces the oil can, and takes his post near the left face of the instrument. When fifteen seconds have elapsed, No. 1 again op-



erates the DISTANT CONTROL T. I. PUSH BUTTON, stops his watch, and calls "TIME, REPORT RESULTS." No. 2 ceases operating the handwheel; No. 3 inserts his RIGHT HAND in the RESULTS OF TEST APERTURE and pulls out a SCORE CARD. He reads it to No. 2, as "PLUS 10." No. 2 sets the remarks scale until the remark corresponding to the score made shows through the window. He sounds off this remark and score in a loud voice to No. 1. No. 1 compares the score and the PASSING GRADE, and orders corresponding corrections set on the ALTITUDE and TEMPERATURE CORRECTORS by No. 2 and No. 3, such as "MUZZLE BURST: HOT STUFF!" He then commands "STAND BY FOR COURSE TWO." Operations as in the first course are repeated, with corrections applied as the NCO sees fit, until a passing grade has been attained, or the student proves hopeless. A new set of firing data is then selected, and the drill repeated, preferably using another instructor on which to orient.

F. MECHANICAL FUNCTIONING

It will not be attempted here to describe in detail all the intricate and involved mechanical solutions of the true-and-false problem made by the Snickers. A few outstanding characteristic details are mentioned below, however, for comparative purposes.

(a) Method of obtaining final results to extreme degree of accuracy by *disintegration* rather than by integration.

(b) Radical departures from accepted standards in the use of inverse cams, special gearing, and interlocking correctional blocks, made necessary by some of the strange functional relations encountered.

(c) Mathematical functional relations solved mechanically are calculated to the greatest degree of accuracy, being of the orders of squares and cube roots. Data taken from most reliable sources available, including Napoleon's Memoirs, Neitsche, Einstein and Prof. J. R. Goodall's "Functional Curves and Their Significance," fifth edition, tenth large printing.

F. SUMMARY

The true-and-false problem like three-dimensional firing and the family budget, is far from cleared up in this one gadget. The Junior C. A. Board feels, however, that a start has been made in the right direction, and that while perhaps some of the methods used in arriving mechanically at the desired mathematical results are directly opposed to all the laws of existing science, it MAY be that the Board is right, and the rest of the world wrong. Only Time and the Efficiency Report can tell!

We live in the present and see with our own eyes what happens to the defenseless in Armenia, Egypt, Morocco, Austria, Germany. We think it wise to keep arms handy, not too many, but bright ones.—The New Republic.

COAST ARTILLERY ACTIVITIES

EDITOR'S NOTE: Under this heading we shall publish each month news from all parts and places and which we believe to be of interest to the Corps. We shall begin with the Chief's Office, listing monthly the personnel on duty there. Under this subheading we shall report any news pertaining to the Coast Artillery as a whole as well as interpreting and making audible such policies as the Chief of Coast Artillery desires to become widely known. We shall not quote the Chief or anyone on duty in his office unless specifically so stated. The Coast Artillery Board and the Coast Artillery School will be included as well as the regiments throughout the States and on foreign service. It is believed that Coast Artillery officers in Hawaii may be expected to be interested in learning what the 61st has been doing all summer. In time it is hoped that all organizations will send a short résumé of their monthly activities to the Editor for publication. Considerable interest has been expressed by a number of regimental commanders even to the extent of detailing an officer as correspondent. We welcome contributions from all individuals. If an item of particular interest should be presented and should the subject appear to be sufficiently important every effort will be made to induce a qualified officer to expand it into an informative and useful article for separate publication. The cooperation of all our readers is sought in this particular effort to make the JOURNAL more interesting.

Office of Chief of Coast Artillery

Chief of Coast Artillery

MAJ. GEN. ANDREW HERO, JR.

Executive

COL. H. L. STEELE

Organization and Training Section

MAJ. S. JARMAN
MAJ. J. B. CRAWFORD
CAPT. J. H. WILSON

Personnel Section

LT. COL. H. T. BURGIN
CAPT. H. N. HERRICK

Plans, Finance, and Materiel Section Intelligence Section

MAJ. J. H. COCHRAN
MAJ. C. H. TENNEY
CAPT. F. J. MCSHERRY

MAJ. S. S. GIFFIN
CAPT. H. N. HERRICK

There have been a number of changes in the Chief's office during the past month. The executive officer is now Colonel Steele. The genial and well-known Major Crawford has arrived from Panama and has been assigned to the Training Section. Another arrival from Panama is Major Cochran. Colonel Burgin has gone back to his old job in the Personnel Section. Don't forget that the Personnel Section is always considerate in the handling of personal requests relating to change of station. If your preferences are not correctly indicated on the last preference card submitted do not hesitate to notify the Chief's office of changes desired. Notification may be submitted personally as well as through channels.

During August and well into September all sections have been occu-

pied principally with the collection of data called for by the General Staff in the preparation of the Survey on Army expenditures directed by the President. The specific information and data furnished as well as the recommendations made will remain confidential until the survey is completed.

In addition to the work which the survey entailed, the Training Section has been engaged on various war plans, reviewing training regulations and correspondence courses, made tentative revisions of certain tables of organization, analyzed target practices, and prepared plans for various tests and maneuvers. A revision of TR 435-55, Coast Artillery Target Practice, has been initiated. The proof of the revised Training Regulation 435-280, Gunnery, was reviewed. The Matériel Section has completed the work in connection with the preliminary estimates for the F. Y. 1931. The directive for the Aberdeen Test exercises (Antiaircraft) was also completed by this section. The new mine manual has received its final review and is now ready for printing.

What does the Personnel Section do? Makes recommendations to the A. G. O. in connection with the foreign service of officers and noncom staff; same for changes of station within the United States; keeps a record of mileage; writes letters to individual officers who inquire as to when they are due for foreign service; keeps a record of efficiency reports; recommends B. A. Group reserve officers for training and keeps account of their mileage, and numerous other matters connected with Coast Artillery personnel. The survey also bore heavily on the Personnel Section.

14-Inch Gun Firing at Fort MacArthur

According to the newspapers and other sources of information, considerable concern has been caused by 14-inch gun (Ry) firing at Fort MacArthur (San Pedro, Los Angeles). The residents living near the firing position complain that considerable damage results to private property whenever this gun is fired. This is the old Coast Artillery bugbear. Our mission nearby always requires the location of our guns near a city or industrial center. Often the best tactical location is in the choicest residential section. Whenever a large gun is fired, pictures, china, windows, etc., are broken. We knew of one case where a cow went dry. Residents are warned but oftentimes won't heed and take precautions to avoid damage. The same situation has arisen numerous times throughout the States and in Hawaii. There are two sides to the question, of course. We can't be expected to be expert with the guns without firing them, and the civilians' annoyance over property damage is understandable. One answer would be to increase the size of reservations and thereby avoid selecting firing positions for the guns in proximity to dwellings. It is obvious that this solution has many difficulties in its way.

The gun which caused the complaint from Fort MacArthur is the

new 14-inch (Ry) model. A second gun just recently sent to the west coast and intended for Fort MacArthur has been held at Benicia Arsenal pending the selection of a location from which target practice can be conducted.

The 4th Coast Artillery (HD) Fort Amador

Since the battle practice of the Coast Artillery units which took place on the Atlantic side in March, the batteries of the 4th C. A. have been busy with rifle, pistol, automatic rifle, and machine gun training and firing. The reports show a great improvement in this regiment in small arms qualifications. The regimental percentage for 1928 was 88.2 per cent, while for the season just completed the percentage was increased to 97.7 per cent. In pistol firing the regiment, including the regimental band, qualified 100 per cent. In gunners qualification all men of the regiment present for duty passed as second class gunners or better.

The regiment is now preparing for the major caliber target practices which will be conducted in November. The objective is a 100 per cent for the regiment. The new 14-inch railway guns have been installed and are being conditioned for the target practice which will be conducted by Battery "G" this fall. Battery "I" which was awarded the District Commander's Cup for all-around efficiency and excellence has been assigned the duty of placing the 16-inch guns in service for a long-range test.

The 7th Coast Artillery (HD) Fort Hancock

During the period August 1-30, 1929, the annual Citizens' Military Training Camp was held at Fort Hancock, New Jersey. A total of two hundred and eighty-six students were enrolled for courses as follows: one hundred and fifty-one Basics, seventy-seven Reds, thirty-three Whites and twenty-five Blues.

Due to fine weather conditions the instruction schedule was carried out completely without an interruption. The Basic course students qualified 100 per cent of those firing the marksmanship course and the higher course students held two Coast Artillery target practices on the 6-inch D. C. guns.

Recreation trips, attended by the entire student body, included a boat trip to Coney Island with visit to Luna Park, and a trip to the Polo Grounds where the New York Giants played baseball with the Chicago Cubs.

A practice march terminating in an all-night camp on the beach was held during the last days of camp. Each C. M. T. C. battery erected a large bonfire on the beach and a midnight supper was provided.

For the first time in three years the weather permitted a graduation

parade on the parade grounds. Awards of the various prizes and trophies was made a part of the ceremony which terminated with the award to the C. M. T. C. Battalion of the handsome cup for winning the intercamp track and field meet from the Fort Monmouth C. M. T. Camp.

A total of two hundred and eighty students successfully completed the C. M. T. C. courses as follows: one hundred and forty-six Basics, seventy-six Reds, thirty-three Whites and twenty-five Blues.

The 13th Coast Artillery (HD) Fort Barrancas

The most successful Training Camp of Fort Barrancas' history was brought to a close August 24, when the last of the components of the United States Army scheduled to train here this summer, entrained for their homes.

The 203d C. A. (AA), Missouri National Guard, commanded by Col. Thomas H. Loy, trained here during the period July 21st to August 4th, inclusive. Maj. W. R. McCleary, Capt. R. V. Ladd, J. C. Stephens and L. Y. Hartman, all Coast Artillery Corps, accompanied the regiment as Regular Army instructors. The "Hound Dawg" Regiment, as the 203d is known, is composed of a Regimental headquarters and Band, Service Battery and Combat Train, eight batteries and a Medical Detachment, all together comprising forty-seven officers and six hundred and four enlisted men.

Next in order came thirty-seven officers and attached officers of the 545th C. A. Res. (AA), commanded by Maj. John H. Brown, 202nd C. A. Brigade, and forty-three officers and attached officers of the 524th C. A. Res. (AA), commanded by Lieut. Col. James K. Jordan, for a two weeks' active duty period from August 4th to 17th, inclusive. Maj. R. N. Perley, C. A. C., was the Unit Instructor with the 545th and Maj. E. H. Freeland, C. A. C., was the Unit Instructor with the 524th. Each of these regiments succeeded in shooting down a towed aerial target. Maj. M. R. Woodward commanded the 265th C. A. (HD), Florida National Guard, composed of twenty-one officers and two hundred and eighty-seven men that trained here during the period August 11th to August 24th. Capt. Webster F. Putnam, Jr., C. A. C., was the Regular Army Instructor.

Visits and inspections by prominent persons during August are as follows:

Maj. C. C. Spencer, Signal Corps, of Militia Bureau, Washington, D. C., inspected the 203d C. A. (AA), Missouri National Guard, August 3d-4th.

Congressman W. Frank James of Michigan, Chairman of Military Affairs Committee in the House of Representatives, accompanied by Capt. Harry A. Dinger, Air Corps, arrived in Pensacola, Fla., in a tri-motored Ford monoplane, August 5th, to visit and inspect Fort Barrancas and the Pensacola Naval Air Station. They departed August 6th.

Brig. Gen. Harold B. Fiske, Fourth Coast Artillery District Com-

mander, accompanied by his aide, Lieut. Thomas S. Timberman and Maj. Richard Donovan, assistant executive, 4th Coast Artillery District, inspected the Florida National Guard and the 524th and 545th C. A. (AA) Res. regiments August 15th and 16th.

Brig. Gen. Vivian S. Collins, Adjutant General, Florida National Guard, inspected and observed the training of the guard August 22nd and 23d.

Battery "A", 13th Coast Artillery, is now engaged in intensive drill in preparation for four special 10-inch target practices, for training Air Corps spotters and observers, to be fired during the first two weeks of September.

The 52nd Coast Artillery (Ry) Fort Eustis

The 622nd C. A. Organized Reserves (twenty-three officers) has just completed fourteen days of training with the 52nd C. A. (Ry). The entire regiment and matériel was turned over to the Reserves for command and training. All regular officers became Inspector Instructors for the period. During the fourteen days the entire regiment went into overnight camp at the firing positions, and the train make-up, movement to firing positions, and occupation of firing positions was accomplished. One of the four firing batteries fired a 12-round service practice with 8-inch guns at nine thousand yards. All four batteries fired several complete sub-caliber practices and analyzed them. The service practice was completely analyzed by Reserve officers without assistance of any kind. The Reserve officers of the 622nd C. A. are enthusiastic over this form of training and received much benefit therefrom. Conferences were reduced to a minimum consistent with proper training. A feature of the training was a four-hour terrain exercise for battery officers, and a troop-leading problem for battalion commanders, involving selection of positions and movement of railway artillery.

Regtl. Comdr., Maj. J. E. Kessler.

2nd Bn. Comdr. Capt. I. W. Wood.

3d Bn. Comdr., Maj. J. A. Lindner.

Btry. Firing, Capt. W. K. Barnett.

During August, 1929, all four mortars in the regiment were equipped with spring-actuated locking lugs on the translating rollers of the breech mechanism. This locking lug prevents the translating roller from spinning out during the counter-recoil of the mortar, and dropping into the pit. Such an accident occurred this year at Fort Story and has occurred several times in the past ten years. Mr. Buckman designed the lug on request of the regimental commander, Col. J. B. Taylor, and battalion commander, Maj. O. C. Warner.

New aiming rule slide bars are being made by the Ordnance Officer, Fort Eustis, for the 52nd C. A. The old aiming rules permit enough

movement of the aiming rule sight to cover about 100 degree traverse whereas the new bars will permit 180 degree traverse and with two aiming rules set on opposite sides of the gun all around fire is secured without interruption of fire.

The next firings in the 52nd C. A. will be a demonstration shoot of thirty-six rounds from a four-gun battery made up of Batteries "E" and "F", commanded by Capt. A. W. Gower, and a shoot of thirty-six rounds from a four-mortar battery made up of Batteries "C" and "D", commanded by Capt. H. H. Slicer. Firing intervals will be forty seconds for the guns and one minute for the mortars. Ranges for guns about nine thousand yards and zones four and five for mortars. A lecture on emplacing and movement of railway artillery will precede the shoot. The demonstration is a part of the Coast Artillery School training. Moving targets and airship spotting will be features of the practice.

The 61st Coast Artillery (AA) Fort Monroe

The 61st is now located at Aberdeen Proving Ground and is conducting tests of the newest antiaircraft equipment before the War Department Board designated to report upon the tests. This is the fourth consecutive year that the regiment has spent the fall at Aberdeen engaged in test work. This year the regiment is under the command of Maj. James H. Cunningham. Its strength is fourteen officers and about three hundred enlisted men.

The movement from Monroe to Aberdeen was not made entirely by motor, as previously announced. The regiment was divided into two sections for the journey. A light convoy consisting of about a dozen vehicles manned by forty enlisted men left Monroe September 6th under the command of Capt. W. F. Marquat and proceeded overland. The first stop was made at Fort Humphries. This detachment prepared the quarters for the regiment prior to its arrival at Aberdeen.

The main detachment, consisting of the remainder of the regiment, left Monroe September 11th aboard the Mine Planter *General Schofield* and two towed barges. All heavy equipment was loaded aboard the barges.

The length of the stay at Aberdeen is dependent on the matériel tests to be conducted but is almost certain to extend well into November.

The 64th Coast Artillery (AA) Fort Shafter

The three Searchlight Batteries of the regiment, Batteries "A", "E" and "I", conducted preliminary and record searchlight exercises during the period July 5th to August 6th. These units were organized as a provisional searchlight battalion and camped in the Ewa district during this period. Two of the batteries each conducted an exercise with one platoon each night, the third battery furnishing the border and objective lights and officials.

The altitude at which air missions were flown varied between nine thousand and thirteen thousand five hundred feet, and the success attained in picking up the plane at the higher altitudes was the outstanding feature of the exercises.

The 213th CA (AA) Pa. N. G. at Bethany Beach, Delaware, August 17—September 1, 1929

By MAJ. JOS. D. EISENBROWN, 213TH C. A. (AA) PA. N. G.

THIS regiment was ordered to active field training at Bethany Beach, Delaware. A unique feature of our training this year was the fact that we conducted our problem of defense, moved our entire regiment to camp by motor equipment, and had plenty of time to shoot while in camp.

The equipment of the convoy in its entirety consisted of the following motor vehicles:

Mack Cargo Trucks (3½-ton)	16
Liberty Cargo Trucks	33
White Staff Cars	2
G. M. C. ¾-ton Trucks	8
Liberty Tank Truck	1
Cadillac Searchlight Units	2
Dodge Touring Cars	3
Rolling Kitchens	9
Water Trailers	10
3-Inch Antiaircraft Guns, M. 1918	4
Holt Tractor (5-ton)	1
Indian Twin-Scout Motoreycles	4
Total Pieces	93

All of the above equipment, with the exception of the motoreycles and Cadillac searchlight units are war-time material, and the itinerary, compiled from Reading, Pa. (the central point of the regiment), will give a comprehensive record and explain how the convoy functioned on the movement to and from Bethany Beach.

Our regiment consisted of forty-two commissioned officers, one warrant officer, and approximately seven hundred enlisted men. Some of the enlisted personnel traveled in their private cars, but each car had to remain with the particular unit of which the driver was a member. He was not permitted to depart from his battery until it had arrived at the bivouac area. Each piece of motor apparatus carried a unit regimental number and, with the motoreycles patrolling our long line, every piece of apparatus kept moving in good order. Whenever any piece of apparatus broke down, the members of the Service Battery, with splendid mechanics for such emergency, soon had them in good running order. At no time did we have to tow any of the apparatus to a camping area.

ITINERARY OF 358-MILE ROAD MARCH OF 213TH COAST ARTILLERY
(AA) PA. N. G.

<i>From Place to—</i>	<i>Date</i>	<i>Miles</i>	<i>Total Time on Road</i>	<i>Rate M.P.H. inc. Stops</i>	<i>Total Halts</i>	<i>Rate M.P.H. exc. Stops</i>
Reading, Pa.			7 hrs.		1 hr.	
West Chester, Pa....	8/17/29	50.4	15 min.	6.95	51 min.	9.34
West Chester, Pa.			7 hrs.		1 hr.	
Milford, Del.	8/18/29	72.7	45 min.	9.39	23 min.	11.42
Milford, Del.			4 hrs.		0 hrs.	
Bethany Beach, Del.	8/19/29	55.7	35 min.	12.17	37 min.	14.05
Totals and rates for downward movement		178.8	19 hrs. 35 min.	9.13	3 hrs. 51 min.	11.36
Bethany Beach, Del....			5 hrs.		0 hrs.	
Milford, Del.	8/30/29	55.7	35 min.	9.98	22 min.	10.69
Milford, Del.			8 hrs.		1 hr.	
West Chester, Pa....	8/31/29	72.7	33 min.	8.51	6 min.	9.77
West Chester, Pa.			6 hrs.		2 hrs.	
Reading, Pa.	9/1/29	50.4	37 min.	7.87	7 min.	11.21
Totals and rates for return movement		178.8	20 hrs. 45 min.	8.62	3 hrs. 35 min.	10.41
Totals and rates for entire movement		357.6	40 hrs. 20 min.	8.87	7 hrs. 26 min.	10.86

Every unit arrived with its motor equipment in good running order, a splendid tribute to the caliber of enlisted personnel in this regiment. On one occasion, in our bivouac area, we discovered a loose bearing in one of the trucks and our mechanics tore down, fitted and replaced this bearing after dark in six hours, with the use of lanterns and headlights from private cars—another sterling example of the sticktoitiveness of the men. Another striking factor of the carefulness of operation of this convoy, through all the dense traffic, narrow roads, etc., was the fact that the entire extent of casualties we had from accident was the scorching of the arm of an enlisted man who was a little too hasty in putting fresh water in one of the radiators. No other damage occurred throughout the entire road convoy. Our success was due to the fact that we were well organized and tried to adhere strictly to the rules and regulations governing road convoys.

We arrived at Bethany Beach camp area on Monday, the 19th of August, at about noon and everybody busied himself in getting equipment unloaded, the enlisted men in tents and made comfortable, and with the thought uppermost in our minds that we were down there to make some records. On Tuesday, the 20th, our first real day in camp, all units complied with the schedules that had been in their possession about two

weeks. The first gun battery was in position and firing a trial shot problem at 1:30 p.m. General routine, with night firing at bursts for the gun battalion, and detail instruction, continued for the first week with the usual field inspection on Saturday. During our first week we had the services of one of our own ships from the 103d Observation Squadron (Pa. N. G.) for daylight tracking missions only, which, of course, was a great help to our gun batteries, awaiting the arrival of the Air Corps from Mitchell Field for towing sleeve targets during our second week's tour. On Sunday, August 25, at about 2:30 p.m., two ships piloted by Lieutenants Shepherd and Pugh arrived with their mechanics and prepared to hop off Monday morning for the towing missions assigned. In connection with our association with the members of the Air Corps it should be stated that they certainly gave us all the flying we asked, and were a splendid example of how the Air Corps and Antiaircraft units should work together.

As stated before, we were out to make some records, and to Battery "C" from Bethlehem, Pa., commanded by Capt. L. C. Atwood, went the honors. During their record firing practice this battery of only ONE gun brought down two sleeve targets in seventeen rounds of ammunition expended. They attained a rate of 16.3 shots per minute and their total score after their entire record firing was 255.6, one that any unit can be proud of. The honors for firing in the machine gun battalion went to Battery "F", from Lancaster, Pa., commanded by 2nd Lieut. Laurence F. Miller. Battery "B" from Allentown, Pa., commanded by Capt. George Ormond, also brought down a sleeve target in their record firing course. These facts are matters of record and we certainly felt highly elated at the splendid showing of all the units of the entire regiment. Owing to the lack of facilities and adequate material no night firing was conducted on sleeve targets.

With all of this tucked in our bosoms and our tour of duty up to this time blessed with ideal weather conditions, we were not to go home without a little of the old war-time conditions of rain, mud, etc., and Thursday night, the 29th, your old "Uncle Davy" sent it down in bucketfuls. So, when we started our departure from the camp site we had real war conditions in moving our heavy equipment. Through the camp area extends a ten or twelve-foot concrete road, and with trucks loading and trying to pass it gave us an opportunity to use our tractor. The minute the wheels went off the concrete they just sunk in to the axles, and then it was tractor them out, which, of course, made our tour of duty complete with all the excitement necessary for a troop movement. We had our entire convoy pointed homeward and on the road at 10:00 a.m., Friday, the 30th, and departing from Bethany Beach we took up our road march with the Bethlehem Steel Works in Bethlehem, Pa., our objective for defense in our final problem. Our tour of duty has shown us that we are:

A mobile unit of the first order.

A regiment of gunners, both 3-inch and machine gun.

A regiment containing that essential "esprit de corps."

A regiment containing technical and mechanical enlisted personnel of the grade necessary to properly function.

A regiment having one of the best musical organizations in the country.

A regiment with a motto, "One for all" and "All for one."

Majors C. B. Meyer and O. G. Pitz, C. A. C., D. O. L., are the instructors on duty with this regiment, and to their untiring effort and ceaseless energy we feel, as a regiment, greatly indebted for their splendid cooperation and instruction. With our Armory training carefully supervised by these two regular officers, it has given us an opportunity to demonstrate to them as well as to the rest of the military concerned that it can be done—and we did it.

The Coast Artillery School

The School opened on September 14 with the students as named in the last issue of the Journal. In addition to the regular officers attending the school the following National Guard and Reserve officers are attending the special six weeks' course which is conducted each fall.

Maj. Walter W. Burns, C. A. (D. C. N. G.)
 Maj. Russell Y. Moore, C. A. (Conn. N. G.)
 Capt. Lawrence W. Eddy, C. A. (Conn. N. G.)
 Capt. Clifton M. Irwin, C. A. (Ore. N. G.)
 Capt. John Q. McNamara, C. A. (Fla. N. G.)
 Capt. Orville H. Thompson, C. A. (Cal. N. G.)
 Capt. Percy L. Wall, C. A. (Fla. N. G.)
 Capt. Arthur C. Weymann, C. A. (N. Y. N. G.)
 1st Lieut. George C. Bray, C. A. (Cal. N. G.)
 1st Lieut. Stanley E. Bye, C. A. (Mo. N. G.)
 1st Lieut. Henning B. Dieter, C. A. (Pa. N. G.)
 1st Lieut. Lyman E. Morris, C. A. (D. C. N. G.)
 1st Lieut. Herman M. Neger, C. A. (N. Y. N. G.)
 1st Lieut. Halton L. Nichols, C. A. (Ill. N. G.)
 1st Lieut. Fred E. Pereira, C. A. (Mass. N. G.)
 1st Lieut. Edwin M. Rick, C. A. (N. Y. N. G.)
 1st Lieut. Albert W. Tucker, C. A. (Mass. N. G.)
 1st Lieut. Joseph W. Vivier, C. A. (R. I. N. G.)
 2nd Lieut. Julian H. Blue, C. A. (N. Y. N. G.)
 2nd Lieut. Joseph J. Consedine, C. A. (Pa. N. G.)
 2nd Lieut. James T. Fain, Jr., C. A.-Res.
 2nd Lieut. Lee J. Harris, C. A.-Res.
 2nd Lieut. Thomas L. Long, C. A.-Res.
 2nd Lieut. Louis H. Smith, C. A. (Del. N. G.)

YOU TELL 'EM

No More Review Articles?

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Suggestions: Don't let Gordon Welch write any more review articles on antiaircraft. Best wishes.

M. M. R.

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Your note with request for suggestions concerning the JOURNAL has been received. My only suggestion is to continue to have such instructive and readable articles as the one written by Captain Welch concerning the AA Battery fire control. To those of us who are on D. O. L. or other duty where we are out of touch with the changes going on in the service it is most interesting to learn of them in so interesting a manner.

I enclose my check for my subscription.

Very sincerely yours,

ALBERT MOSSMAN,
Capt. C. A. C., D. O. L.

Eighteen Back Copies

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Will it be possible for you to furnish me with eighteen copies of the COAST ARTILLERY JOURNAL for the month of August, 1929?

If you can furnish these I wish you would forward them to my address in Reading and send me bill for same, as I am extremely interested in the articles by Captain Welch and Captain Wells, and I want to give every one of my officers a copy of this issue.

Very sincerely yours,

JOS. D. EISENBROWN,
Major, 213th C. A. (AA) Pa. N. G.

Eventually, Why Not Now?

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Your campaign to bring the JOURNAL out of the attic and dust it off a bit should meet with hearty approval from the younger officers of the Coast, at least. All with whom I have discussed the subject feel that in

trying to graft into the dowager-like magazine a little flaming youth, you are putting your finger on the exact reason why many of us, once subscribers, have let it go. I wish you the best of luck. It will be a pleasure to watch the JOURNAL's progress to that point where I will be among those who will be glad to have it come each month.

In the line of suggestions let me say: (1) As you respect your prospective subscribers, curb definitely any inclination among older officers, especially unit and post commanders, to carry out the subscribe-or-suffer-on-your-efficiency-report method. This suggestion does not in any way hit at your enjoyable, lively campaigning, which all of us appreciate. (2) Follow the *Naval Institute Proceedings* in the matter of using a profusion of full-page illustrations. Surely, there is much of historical as well as professional interest you could cover thus. Also, the field is opened for illustrated articles on our various posts, especially foreign service stations. (3) Wherever possible, give officers other than the Old Guard from the School, a chance to publish their articles. Do not, however, imperil either their reputations or the JOURNAL's by turning out half-baked fungi (he used another word).

I wish you the best of luck in the pursuit of the elusive subscription. Please credit me with interest in the search. It will be a pleasure to fall a victim to the new JOURNAL—some day.

Sincerely yours,

(A lieutenant whom we will protect from the Old Guard by refusing his name.)

Fort Inaccessibile, August 18, 1929.

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

I don't know you, nor anything, but it seems to me that when the editor of a great big magazine like the COAST ARTILLERY JOURNAL takes all the trouble to go and write a personal letter to one of his subscribers that he's never seen that he ought to get a personal reply. I've always been very polite that way, and I'm not going to change now just because I'm in the Coast Artillery. It certainly cheers a fellow up, when he's been sent away off to a place like this, just because he stopped at the ninth decimal place in figuring a figure of merit, to find out that the Intelligence Section of the Chief's office hasn't forgotten him, although the Personnel Section seems to have. I could say something dirty right there, what with that word "intelligence" handy, but I'm not sure just how thick you are with the Chief's office.

Anyway, you asked in that fine letter of yours for suggestions. So I'm going to give you some, because I think every one with good ideas like mine ought to help out with them. I'm keeping a carbon copy of this

letter, not because I don't think you'd try to get credit for my ideas, or anything like that, you understand, but I'm just methodical that way.

Now, I think there ought to be more reprints of those historical monographs that they write down at the Coast Artillery School, and I'll tell you why. It's hard to get to sleep here at night. It's so quiet, with no sound except the flakes of rust dropping off all the batteries out of commission, that it gets so darn creepy a fellow can't sleep. Please excuse that word "darn", I know it isn't no magazine word, but it's a big outdoor word and it just kind of slipped in. Well, when I got here some time ago I could always count on plenty of those monographs in the JOURNAL and they certainly were fine for getting a fellow off to sleep. Now I have to go back to sheep-counting, and drinking warm milk, and they're not sure-fire, like the monographs.

Then I've got another idea. I think you ought to start a series of those "Interesting Service Women" articles like the *Army and Navy Journal* used to publish, and I don't see why they ever stopped, just when the search was narrowing down to where they were sure to turn up a woman who WAS interesting, if they kept on. Well, I'll tell you why I think you ought to start them. First of all, they're a great help to us married men. When the wife gets too darn—hell! there I've used that word again!—well, too uppity, we could always fold the *Army and Navy Journal* over to that weekly article on an interesting Service woman and hand it to her with some crack about her not being nobody. After a while all we had to do was hand it to her and duck. Second, they're economical, what with the women writing them themselves.

Well, when I get some more good ideas I'll send them along. And I'm sending along my three dollars for the JOURNAL in spite of the fact that I'll have to stall off next month's installment on a new tire I just got for the Ford. But I think a bright fellow like you with such a friendly spirit needs encouragement when he's just starting out.

Your well-wisher,

J. OLNEY SKLISH,
2nd Lieutenant, C. A. C.

There Were Men in Those Days

The following letter dated January 28, 1763, has just been received from a reserve officer named Capt. Edward Gibbon. The delay in this correspondence does not appear remarkable to us, but then we have just served a tour with the Organized Reserve. Captain Gibbon will probably be better remembered as the author of the "Decline and Fall of the Roman Empire." Apparently his letter was written before he began work on the history which made him famous. Perhaps the conditions he describes in his letter influenced him somewhat in his undertaking.

The letter was written so long ago that we think it better to describe

the setting for our readers. Both young Gibbon and his father belonged to the Hampshire County Militia—Gibbon, senior, was a major and young Gibbon a captain. The outfit was under the command of one Sir Thomas Worsley, "a baronet who spent much of his time at Spa and other health resorts." Gibbon, senior, also had his farms to look after and we gather that the regiment would have gone entirely to the dogs if it hadn't had the guidance of young Captain Gibbon, who was the "old man's" right hand and carried on the routine as regimental commander, in fact. At the time at which he writes William Pitt, the Prime Minister, had announced M day, a few months before the battle of Minden, the excuse being the imminent invasion of England by the French. The Hampshire contingent was called in—to active service, among others. The anticipated invasion failed to materialize but the battalion was held in service and finally came to Southampton, "the resort of rank and fashion," for station.

Young Gibbon did not have easy sailing in the absence of Sir Thomas and his father, the second in command. He engaged in a row with the Duke of Bolton, the Lord Lieutenant of the County, who claimed the right to command the battalion. The Duke appointed an adjutant. Captain Gibbon did not approve of the Duke's appointment and carried it to higher authority. Higher authority refused to interfere. To rub it in the Duke promoted the adjutant. In retaliation Gibbon had the adjutant barred from the mess, although there were some "gentlemen privates" who were members and also one member who was permitted to resign just before going to jail for debt. Gibbon gave "a little dinner" for the officers of the regiment and tried to exclude the adjutant but finally had to invite him. This dinner cost \$65.00 for which was provided "six dishes of turtle, eight of game, with jellies, syllabubs (which we could do without), tarts, puddings, pineapples, in all twenty-three things, besides a large piece of roast beef on the side table with port, white wine and punch." But read the letter:

The Editor of the ARTILLERY JOURNAL:

Sir:

I am writing this epistle with the hope that you will publish it in your columns and that it will bring to the attention of all who read it two matters in which I have the greatest concern—the excessive cost of living and the entire lack of sobriety which exists in the service today. The great amount of entertaining which an officer is compelled by custom to undertake with the accompanying drinking of spirituous and intoxicating liquors not only is impossible to accomplish on the limited service pay, but detracts from the efficiency of the commissioned personnel and is conducive to the present lack of discipline and an excessive number of courts-martial. I can think of no more emphatic manner of presenting the facts than to quote the following extracts from my journal:

"I had a good deal of company at Deal, and as I paid for them all, the fortnight cost me eighteen guineas. One day, besides our own Corps, I had Captains Meard, Whitfield, Carry, etc., of the 14th, with their wives, to dinner, supper and breakfast. Another day the men only. We drank very hard both days."

"22nd—Captain Perkins dined with us today, and led us into an intemperance we have not known in sometime past.

23d—I could do nothing this morning but spew. I scarce wonder at the confessor who enjoined getting drunk as a penance.

25th—Thresher came to quarters today and occasioned it being a very debauched one.

27th—Must I again set down that we drank too much today?

28th—Today Sir Thomas came to us to dinner. Pleased to see him, we kept bumperizing till after roll-calling, Sir Thomas assuring us, after every fresh bottle, how infinitely sober he was grown.

2nd—Another drunken day."

"Keate and Stephens dined with us, and to our immortal honor, be it spoken, we sent them both pretty drunk to the assembly."

"5th—This morning was terribly broke into by the adjournment of our court-martial which lasted 8 to 10, and a field day which I attended from 11 to 1. However, as the greatest difficulties are those occasioned by our own laziness, I found means to go through the Racine Greeque's from 28-32, to review the whole sixth book of the *Iliad*, and to read the seventh in this busy day."

My interest in military matters has been considerable, although I find little time to devote to the practice of the profession. The following entry is an indication of my sincere desire to improve our situation:

"May 7th—We had a very good field day with officers. I never saw the battalion do anything better than marching in battalion slow time down the hill, and halting to fire by subdivisions every ten or twelve paces. We tried a new thing of my invention, firing six deep."

Thanking you for the printing of this letter, I am,

Your obedient servant,

EDWARD GIBBON,
Captain, 1st Hampshires.

NOTE: Gibbon's Journal has been published recently by Chatto and Windus. 17s. 6d. net.

Maybe It Needs S. A.

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

* * * * As to the JOURNAL I haven't been a subscriber for years. Not that I begrudged the subscription price, but more as a sort of silent protest against the JOURNAL as it was. I don't know just what to suggest to give the JOURNAL the appeal it has lacked in the past. You have such a wide range of interests to cater to, ranging from the junior officers to the seniors, that I realize how much beset with difficulties your task is.

One fault that I have found with the JOURNAL in the past is that it has too frequently been the means of some young officer, as yet unknown to fame, obtaining a quasi publicity through his very ingenious (?) slip-stick for adding two and two. Again, it has been the instrument for younger officers to keep their elders informed as to how the latter should do their jobs, such as making tactical inspections, and matters of like nature. Now, of course, a service journal, to be successful, must be attractive to all officers of its arm. The only suggestion that I have to offer is that an effort be made to get away from the provincialism that has characterized the Coast Artillery in the past, and still does, to a certain extent. We are too prone to keep our feet firmly planted on concrete. The idea prevails in some quarters that we are a "Corps de'élite." Bunk, of course. We can shoot guns; ergo, in any unpleasantness with a foreign country that may necessitate the shooting of guns, we will be on hand shooting along with the rest.

Sincerely yours,

DICK.

Thank You, Colonel

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Your letter received and have brought its contents to the attention of all officers of the regiment for their suggestions or comments. The officers who are not subscribers at present have expressed their intention of subscribing.

Few suggestions as to the contents of the JOURNAL have been received. In this regiment it is felt that many valuable and interesting articles on the subject of antiaircraft firing, matériel and their related subjects have been published, and we hope that they will continue. A suggestion has been made by one of the officers of the 63d that the articles written by the Battery and Field officers' classes for delivery at the Wednesday afternoon sessions of the School be used only when they are of highly practical value to Coast Artillery officers.

I have designated Captain Supple to furnish a short article monthly on the Regimental doings and am inclosing a brief article covering our trip to camp (Camp McQuaide, Capitola, Cal.) which is the only outstanding event at the present time.

Sincerely yours,

C. W. WALLER,

Lieut. Col., 63d C. A. (AA), Commanding.

Maybe He's Just Being Polite

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

I wish to say that I find the COAST ARTILLERY JOURNAL a most satis-

factory and authentic source of information pertaining to developments in Coast Artillery. The articles are interesting and well written.

I extend my best wishes for your success as editor of the COAST ARTILLERY JOURNAL. The renewal form has been returned.

Yours very truly,

J. C. ENDEBROCK, JR.
2nd Lieut., C. A., Res.

Likes Ballistics

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

Thanks for your letter of August 16th. I am sending, enclosed, my renewal and check.

The articles I most prefer are those on ballistics.

Yours very sincerely,

HENRY B. HEDRICK, *Ph. D.*

Davy Jones Speaking

The Editor of the COAST ARTILLERY JOURNAL:

Dear Sir:

It is very surprising how sounds carry under water. The tap of a one-pound hammer swung against the inside shell of a ship can be heard four miles. A battleship traveling full speed can be heard twenty miles. But more important than the range of sound in water is its trueness in direction. In water over thirty feet deep sound travels as straight as the proverbial arrow.

The trouble with under-water listening is that bad sounds travel as far and as true as good sounds, which is sometimes confusing. However, the human ear has a remarkable ability to select an individual sound out of a babel of noise and focus attention on this single sound to the exclusion of others. This ability is the salvation of under-water listening.

Direction is determined in under-water listening in the same manner that it is determined by a person walking in the open country—principally by the so-called binaural sense—but also to a minor extent by the relative loudness of the sound in the ears as the head is turned.

The “binaural sense” involves the ability to tell when a sound arrives at both ears at the same time. We ordinarily think of the “visual sense” as being much more delicate than the “aural sense.” Of course, to compare the eye and the ear is to compare things essentially incapable of comparison. Still it is interesting to note that the eye is totally insensitive to differences of time in the order of 1/50 to 1/500 of a second (some one has told us that this is the reason for Hollywood), while the binaural

sense gives us the ability to "center" sounds, to an accuracy of the order of 1/10000 to 1/100000 of a second.

That is to say, if sound arrives at one ear one-ten-thousandth or perhaps one-hundred thousandth of a second before it arrives at the other ear we know the sound is "off center" and, without knowing why, automatically turn the head toward the sound so as to "center" it.

Further discussion of under-water listening would involve electricity, imaginary algebra, hyperbolic functions, the theory of wave motion, and a lot of hard work. As the policy of the editor is to make the JOURNAL "newsy," I cease before becoming all wound up in differential equations. However, if you come to Fort Wright, you can listen to all these things yourself. Most of you will say, "It's just a noise," but I assure you that the noise is made up of all the funny things I have mentioned.

ROGER B. COLTON,
Major, C. A. C.

The most pervasive element in the Army is education; the service as a whole is undergoing a continuing process of self-training and self-advancement. Rank and file alike spend alternate periods in study and in imparting to others that which they have learned. The soldier of today is not the machine-drilled automaton of Frederick the Great, he is a man forced to act largely on his own responsibility, to draw on himself for endurance, for will-power, for decisions. The more he knows, the more valuable he is.—Extracts from an address by Gen. Charles P. Summerall, Chief of Staff.

PROFESSIONAL NOTES

Target Practice with the Eight-Inch (Converted) Rifled Seacoast Guns

By COL. JOHN A. LUNDEEN

It may be interesting, especially to the younger members of the Coast Artillery, to recall that our present Seacoast breech-loading rifles date back only to the Spanish-American war. Before that we had only the clumsy smooth bores, firing a round projectile, with a few eight-inch converted rifles that had been made for us and used a few years before this war. I wish to speak of those and what a few plodding artillerymen did with them.

The 8-inch converted rifles were not the first rifled cannon that we used, for Robert P. Parrott, a graduate of the U. S. Military Academy, invented and manufactured the Parrott muzzle-loading rifles that were used during the Civil War. He was superintendent of the Cold Spring Iron and Cannon Foundry where his cannon were made. Some of the Parrott rifles were mounted and used for target practice at West Point while I was a cadet there, but owing to the fact that they were not strong enough for the new powder, and several exploded in firing, they ceased to be used before the 8-inch converted rifles were made.

These eight-inch converted rifles were made by the Ordnance Department by inserting a steel tube into the old 10-inch smooth-bore gun and rifling it so it could fire an oblong projectile. To make an oblong projectile grip the rifling grooves in a muzzle-loading rifle a soft cap of metal was placed at its base. The powder pressure acting on this lead or soft metal, expanded it outwardly, forcing it into the grooves of the gun, causing the projectile to rotate as it is fired. If I may be pardoned, I will speak of personal experiences in using these guns.

Seven companies of the 4th Artillery came from Fort McPherson, Ga., to Washington Barracks (where the War College now is) and to Fort McHenry, Md., and stayed there from 1893 to 1898, and as we could have no target practice at either of these stations we were sent to Fort Monroe for it. While there, besides firing some of the old smooth bores, during the latter years of our stay we fired the 8-inch converted rifles, a few of which were then mounted. There happened to be several young officers stationed there at this time who afterwards became noted as advanced artillerymen, and they assisted materially those of us who came down for our target practice.

We used temporary base-end stations from which we observed the location of the targets and guns and plotted them on home-made plotting boards. The targets were small pyramidal ones anchored about thirty-five hundred yards away.

The range tables that we used were calculated by artillerymen and

needed correction for changes in initial velocity, wind velocity and direction, temperature, etc. As the powder charge was first put in the gun and pushed home to the bottom of the bore and the projectile then rammed home against it, the space occupied by it, that is, the density of the gases at the initial moment of discharge, varied considerably, causing another variation in the initial velocity of the projectile. Various methods were resorted to to make this density of loading uniform (as, of course, it is in breech loaders). One that I finally adopted, and which proved very good, was to insert small wooden rods of exactly the same length in the middle of the powder cartridges and then pushing the projectile down till it touched the outer end of the rod.

As we had not then any calculated tables for all these corrections we had to figure them out before each shot, which took much time, but as the targets used did not move except as the tide and wind moved them it did not matter. The result was very satisfactory and we did some wonderful shooting. In a morning's target practice, after we had got used to the guns, etc., we often demolished several targets and I remember one occasion when in three successive shots with the same gun the first one struck the target demolishing the top, the second fired at the wreckage entirely destroyed that, and the third fired at another target anchored a short distance away hit that also. The last season we were at Fort Monroe we destroyed so many targets for them that they had to obtain an extra supply, and we thought we were some artillerymen.

It was not until four or five years later, after a number of the new eight, ten and twelve-inch breech-loading rifles had been made and installed, that a board, of which I was a member, devised the charts and instruments even yet in use in the Coast Artillery plotting rooms, by means of which we were enabled to get the necessary corrections of the ranges to the guns quickly enough to enable us to fire at moving targets.

The 155-mm. Gun Explosion at Fort Kamehameha, T. H.

By MAJ. E. H. UNDERWOOD, C. A. C.

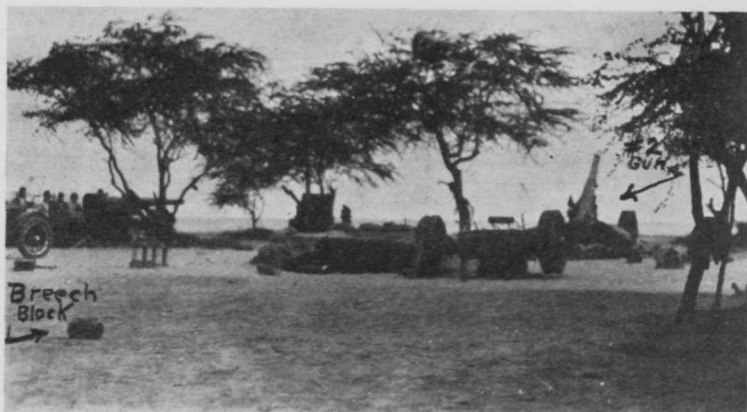
EDITOR'S NOTE: The following article, written by an eye-witness, describes one of the most serious accidents which has ever occurred in the Coast Artillery. Major Underwood was recorder of the board which conducted the investigation to determine the cause and responsibility. At the time the explosion took place the new T. R. 435-184 was ready to go to press. Upon receipt of the board's report the printing was postponed in order that revision might be made and certain safety regulations included which would prevent a recurrence of an accident of this kind. The revised training regulation will be issued, probably before this article appears in print.

On the afternoon of April 18, 1929, there occurred at Fort Kamehameha, T. H., one of the most serious accidents to which the Coast Artillery is subjected.

The 1st Battalion, 55th Coast Artillery (Tractor-Drawn), was firing its record day-practice. Battery "C" fired first and fired an excellent shoot.

Battery "A" followed and also had an excellent practice. Battery "B" was the last to fire. There was a delay of two hours and fifty minutes between the practice of Battery "A" and Battery "B" due to the target capsizing and a rain squall which obscured the target. After this delay the firing began and eight ranging shots were fired. As the gun crews were loading for the first record salvo an explosion was seen and heard at No. 2 gun. Two of the gun crew were instantly killed, one died about thirty minutes later at the hospital, and a fourth died the following morning. Two men were seriously injured and eight others suffered minor injuries.

After the dead and injured had received attention the gun was ex-

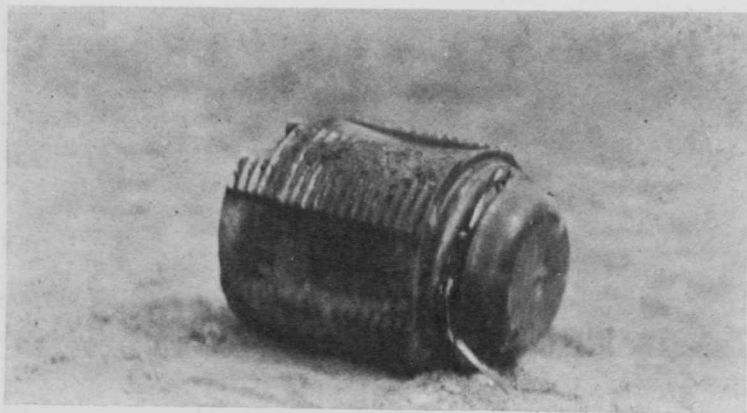


AFTER THE EXPLOSION—SHOWING THE BREACH BLOCK
WHERE IT FELL

amined to determine what had happened and the cause. It was discovered that the projectile had left the muzzle. The breach block had been torn from the block carrier, had struck the ground eight and one-half feet to the rear, and ricocheted to the rear, finally coming to rest at a distance of over ninety feet from the gun. The block carrier was torn from the gun itself and was found eighty feet to the right and rear of the gun. The percussion mechanism and the firing mechanism block latch holder were torn from the block carrier. The percussion hammer lock bolt was found in the unlocked position. The firing mechanism was found in the breach block but only partially inserted. The head of the primer and portions of the primer body were found in the firing mechanism, the primer having the typical indentation of the firing pin. The gas check pad had disappeared entirely, apparently consumed by the flame. The filling-in disk was warped and considerably bent. The split rings were bent out of shape and broken. The threaded sections of the breech recess showed no evidence of stripping but did show evidence of having

had some hard objects, apparently the split rings, dragged roughly and with great force across them.

The board, which was immediately appointed, conducted an exhaustive and detailed examination of personnel and matériel to discover further information which might show the exact cause of the accident. In this battalion the regulation lanyard remains attached to the percussion hammer during firing. In Battery "B" all lanyards had been shortened by chain knots to approximately thirty inches to prevent the lanyard touching the ground when the gun was elevated. Powder charges intended for firing in this practice and similar to the one in the gun when the



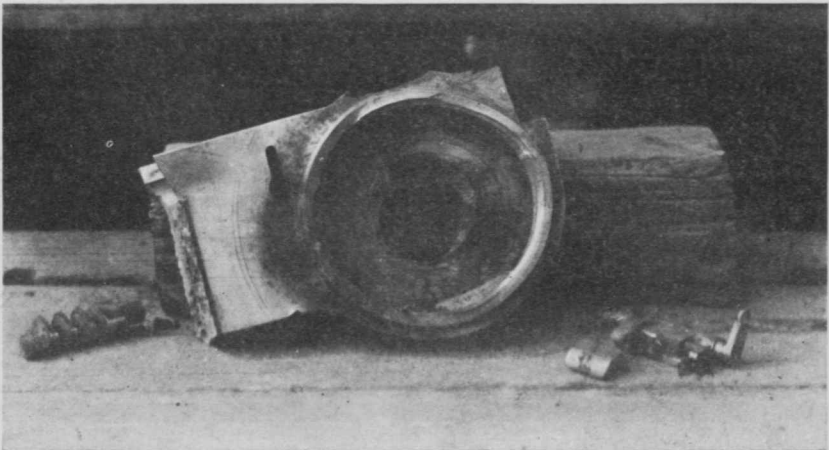
THE BREECH BLOCK—SHOWING REMAINS OF SPLIT RINGS.
AND FILLING-IN DISK

explosion occurred were found to be in good condition. The projectiles had no fuze or bursting charge. An examination of the bore disclosed a small quantity of black ash.

All matériel of this battery had been inspected prior to the firing by a competent Ordnance machinist and found to be in good condition. The chamber of No. 2 gun had been thoroughly sponged after the last ranging shot, the breech having been open more than a minute. Approximately six minutes had elapsed from the firing of the last ranging shot from this gun until the command "Commence firing" for the record shots was given. This elapsed time would seem to eliminate the possibility of a flare-back caused by gases or smoldering residue of powder or bag.

A number of experiments with two guns were conducted to discover other possible causes of the premature firing. Some black powder was placed in the breech recess, as it might have come from a torn powder charge, and the breech block slammed many times in an effort to set it off but without result. Some sand was then mixed with the black powder and the breech block slammed but the powder failed to detonate. A

firing mechanism, containing a primer, was partially (about one-third) inserted in the breech block, the block closed, the lanyard pulled, and the primer fired. A number of unloaded primers, containing only the caps, were then inserted in the firing mechanism and the firing mechanisms partially inserted in the breech block. With the percussion hammer lock bolt in the unlocked position, the breech block was slammed many times. The cap failed to explode, although the percussion hammer would swing up and hit the firing pin, making a small indentation in the cap. The experiment was repeated with a long and short lanyard attached, but the cap failed to detonate. An attempt was made to foul the lanyard as



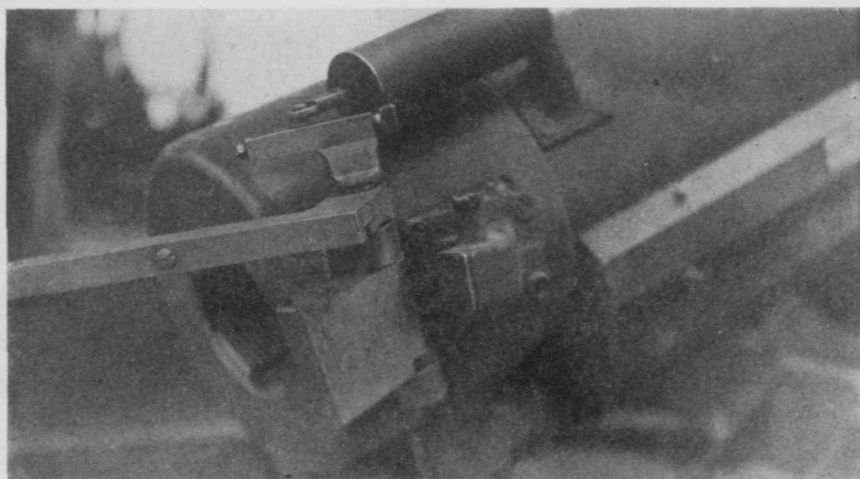
THE BLOCK CARRIER AFTER THE EXPLOSION

the breech was closed. The cap failed to explode, although an indentation was made by the firing pin. Testimony from all available witnesses was taken.

After all possible information had been obtained the board believed that the battery personnel was satisfactorily trained in its duties and that the battalion and regimental commander had exercised unusual supervision over the gun drill and safety precautions. Due to shortage of commissioned personnel there was no officer at the guns during the practice. It was possible that some violations of safety precautions might have occurred in the enthusiasm of the gun crew to shorten the time of loading and laying, but these violations were concealed from the battery officers. In the opinion of the board the accident was not caused by the use of the shortened lanyard nor by a powder charge which had deteriorated or which had been torn, allowing black powder to escape and be brought in direct contact with the breech block and recess. Nor did the board believe that a flare-back was possible.

The exact cause of the accident the board could not discover due to

the death of the most important witnesses. But from the best evidence which could be obtained it appears most probable that some member of the crew in a laudable effort to gain time but in violation of existing orders partially inserted a firing mechanism, containing primer, in the breech block before the block was closed and rotated. When the block struck the face of the breech and before it was rotated either the inertia of the hammer caused it to strike the firing pin at this instant and fire the primer or the lanyard, becoming fouled as the breech was being closed, caused the same result. The explosion of the propelling charge with the threaded sectors of the block disengaged could easily tear the block, block



SHOWING REMAINDER OF BREECH MECHANISM

carrier, and firing mechanism from their position and cause the loss of life and injury to the gun crew which occurred.

In order to avoid a recurrence of this sad and regrettable accident the board made suitable recommendations to higher authority with a view to their incorporation in the new training regulation for this gun. It was recommended that the percussion hammer lock bolt be locked immediately upon opening the breech and that it not be unlocked until after the breech has been closed and locked. The firing mechanism should not be inserted until after the breech block is rotated and locked. The assistant No. 1 cannoneer should be prohibited from handing the firing mechanism containing primer to No. 1 cannoneer until the breech block is rotated and locked. The board believes the lanyard should be permanently attached during firing but of such length that it cannot touch the ground even when the piece is elevated. In a matter which would necessitate a modification, the board recommended that the gun be provided with an automatic safety mechanism which would prevent the insertion

of the firing mechanism until the rotation of the breech block is almost completed. As to commissioned personnel, the board believes that at least one officer should be present for each two guns to supervise the service of the guns and to see that the gun crew complies with the safety precautions. Since the indirect cause of the accident was the desire of the crew to attain high speed the board believes that it would be well to establish a minimum rate of fire which should not be exceeded and which would be slow enough to permit personal supervision by a commissioned officer and enable him to compel a thorough compliance with the safety precautions prescribed.

The Schneider 75-mm. A. A. Gun

A description of the Schneider 75-mm. "S" type antiaircraft gun, 1926 model, is given in the July issue of the French *Revue d'Artillerie*. The Schneider "S" 75, designed in order that the French Army should be provided with a mobile gun, is mounted normally on a wheeled carriage capable of rapid loading and rapid rate of fire. It has an uninterrupted field of fire and can fire through every angle from the horizontal to the vertical. There is no dead angle. On its wheeled carriage it is no heavier than the normal field howitzer (French). It can be put in action while on the march without special equipment or preparation of ground. The gun can be loaded rapidly at any angle of elevation and the Schneider breech permits of semi-automatic fire. The gun is stable when fired at all angles.

The projectile weighs 14.3 pounds. The muzzle velocity is twenty-three hundred feet per second. The rate of fire is from twenty to thirty rounds per minute. Continuous laying is maintained by the employment of the *Correcteur Schneider*.

The breech is operated automatically by a special mechanism or by a hand lever. The movement of the gun in recoil opens the breech, ejects the empty shell case and recocks the firing mechanism. The breech opens and closes with a quarter turn on a horizontal axis and forms a loading platform (tray?) when open. A special spring catch for the shell case rim makes it possible to load the gun at any angle. The gun is fitted with an automatic fuze setter. This consists of a cylinder attached to the left-hand side of the mounting. In the cylinder are two indented rings in which projections on the fuze and projectile catch. The ring which rotates and sets the fuze time ring can be moved radially up to an angle of forty-five degrees. After the fuze setter has been adjusted to the required setting the loader sets his fuze by pushing the shells into the cylinder. Thanks, *Army, Navy and Air Force Gazette*.

A Design for 155-mm. Gun Emplacements

EDITOR'S NOTE: At the close of the war we found ourselves in possession of approximately three thousand 155-G P. F.'s. This gun is of French design, tractor-drawn, and capable of a traverse of sixty degrees

DESIGN FOR
155^{m/m} GUN EMPLACEMENT
Reduced from Engineer Specifications
Scale: $\frac{1}{8}" = 1'$

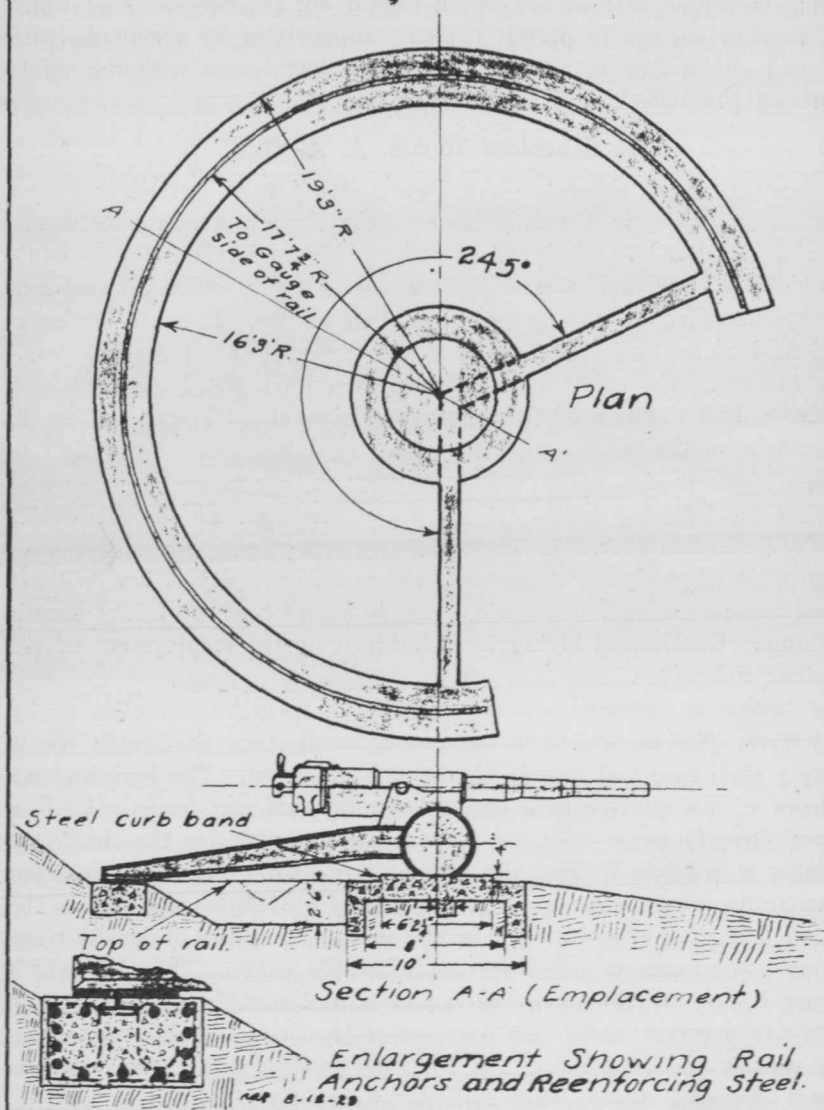


FIG. 1

when emplaced. Designed primarily for firing on land (stationary) targets, it did not lend itself well to the Coast Artillery game, i. e., firing on moving targets. The gun itself is almost perfect as a piece of mechanism. Its recoil system is superb and the armament probable error less than any gun of about the same caliber which we had previously adopted. All officers who have had experience in firing it are enthusiastic over its performance. Every effort was made to modify it so that it could be used for firing on a moving target both in Case 2 and Case 3. A

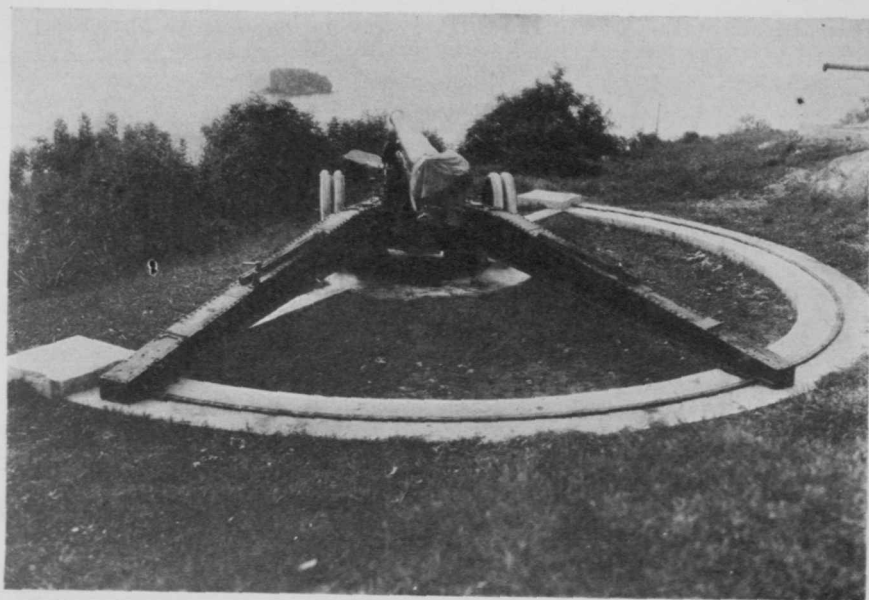


FIG. 2

sight modification was made which has been fairly satisfactory in its operation. The firing mechanism was altered so as to permit a more rapid rate of fire. However, it was still unsatisfactory, due to the limited field of fire—sixty degrees. In emplacing a battery of four it was customary to place the guns so as to cover a battery field of fire of about one hundred and twenty degrees. Naturally all four guns could not be brought to bear throughout this arc. It should be remembered that the trail and spades cannot be shifted in the same manner as for a light field gun. It required from one to two hours to shift the arc of fire. We desired to make use of this gun. It was an excellent weapon of about the proper caliber for mine field protection, for use against transports, destroyers, landing and raiding parties. It was mobile and could quickly be removed from harbor defenses and used with the land forces. But probably the most important consideration was the matter of economy. It was on hand in considerable quantity. No one could tell when we would obtain the

appropriations to design and manufacture a more suitable gun. Several schemes have been devised to obtain the additional traverse desired. One of them is published below. The information, photographs, and drawing from which this article was written were furnished by Maj. Paul H. French, C. A. C., and Capt. Ben Bowering, C. A. C., both officers now serving in the Canal Zone. The drawing does not show a correction which has been made to permit more space behind the trail for the gun crew to operate. If anyone "knows a better 'ole" let him go to it and send it in to us.

In the adaptation of the 155-G. P. F. for harbor defense purposes, we

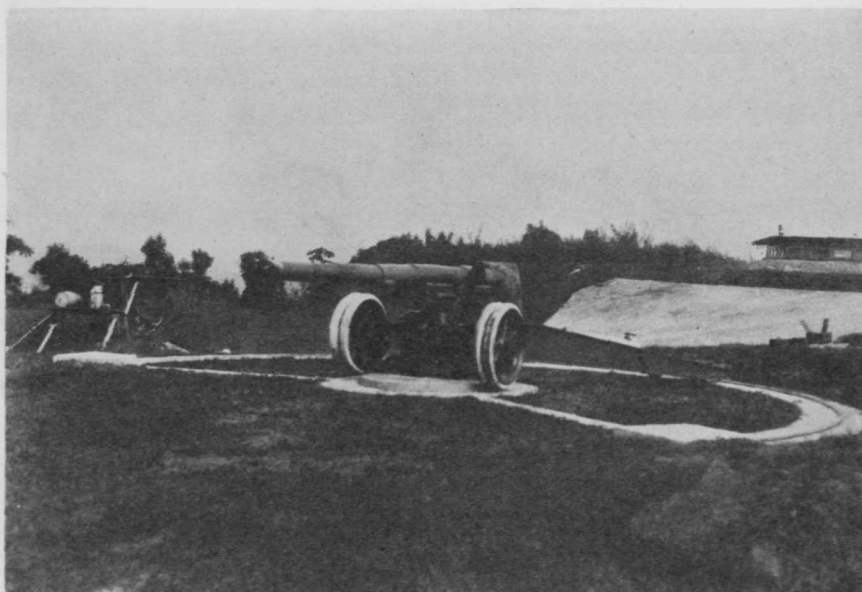


FIG. 3

desire to call attention to one instance in which the Coast Artillery has cooperated to the fullest extent in reducing the cost of national defense. We have taken a gun entirely unsuited for our purposes and made an efficient weapon out of it. It would have been easier to have thrown out the 155-mm. gun and set up a wail for a gun that "had everything." In the successful adaptation of this gun proper acknowledgment is made to the Ordnance Department and the Engineers.

A simple and satisfactory permanent emplacement for the 155-mm. gun has been developed in the Panama Coast Artillery District within the past few years and is now in use at various points in the harbor defenses located at each end of the canal. The permanent emplacement enables the gun to be fired throughout an arc of fire much greater than sixty degrees—the ordinary limit of traverse permitted by the traversing mechanism of the

gun itself. In fact the emplacement can be constructed to permit an all-round field of fire.

The construction of the emplacement is so simple that any explanation in addition to the accompanying reproduced photographs and drawing is almost unnecessary. The concrete was reinforced throughout with $\frac{5}{8}$ -inch steel rods. The spade connecting plates were removed by cutting the rivets, and steel guide plates were bolted in their place. The plates fit over a curved railroad iron which was imbedded in the circle of concrete and which was anchored in the concrete by steel hooks. A steel curb band surrounds the raised concrete inner circle and serves as a guide for the wheels of the carriage. This wheel guide was found necessary to prevent the trail plates binding on their guide rail.

The gun is fired on its wheels. The guide rail upon which the trails slide, as well as the inside curb band, are kept well lubricated to facilitate the movement of the trails. The trails are moved by hand. When the target appears to be approaching the limit of traverse permitted by the top carriage the gun crew is directed to man the trails. Four men on each trail are necessary to move the trails in the desired direction. The mobility of the gun is retained by having the trail spades and limbers at hand. The motive power is the ten-ton tractor.

In addition to special test firings the guns have been fired from these emplacements during target practice and have been found entirely satisfactory.

Officers of the Regular Army on duty with the National Guard and the Organized Reserves will keep themselves fully informed at all times of the purpose and scope of the Special Course at the Command and General Staff School for National Guard and Reserve officers; when the course begins and ends, and what preparation is required by officers entering upon this course. Upon designation of any officer, all executives will see that he receives every encouragement and assistance in his work of preparation for the course.

References: A. R. 350-5, dated August 1, 1925; W. D. letter A. G. 352.01 (7-3-29) Misc., dated July 3, 1929.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. W. E. COLLE, Colonel, Coast Artillery Corps, President.

Project No. 727, Confidential.

Project No. 728, Confidential.

Project No. 729, Specifications for Antiaircraft Fire Control Director.—These specifications refer to an antiaircraft fire control director designed and intended to supersede the Director T4. This instrument will control the fire of four 3-inch A. A. guns by the indirect system only; that is, all sighting apparatus will be omitted from the gun carriages and the data required for laying the guns on the future position of the target furnished the guns by the director with all corrections applied. The Coast Artillery Board studied the specifications as laid down, and suggested modifications.

Project No. 730, Specifications for an automatic Data Computer for Seacoast Artillery.—These specifications refer to a seacoast artillery data computer which will control automatically the fire of seacoast or railway batteries. It will be universal to the extent that it can be used with any battery and any combination of not more than two observing stations located within limits specified. The Coast Artillery Board has studied the specifications as laid down and has recommended the specifications be approved and that a pilot model be manufactured for test.

Project No. 731, Lighting Devices for Panoramic Sights, Scales, and Aiming Rules, Railway Artillery.—The Coast Artillery Board is making a study and test of various devices for illumination of sights, scales, etc., of fire control instruments used by railway artillery in night firing.

Project No. 732, Time-of-Flight Clock.—A report containing description and operation of a Time-of-Flight Clock was received and studied by the Board. The Board is of the opinion that no action be taken at the present time in respect to use of time-of-flight clocks, pending tests of other means of accomplishing the same object.

Project No. 733, Test of Tool Equipment, Type TE-30, and Pouch Type, CS-34.—A service test is being conducted under the supervision of the Coast Artillery Board with a view of determining the desirability of substituting Tool Equipment Type TE-30 for the present standard equipment Type TE-5. The Tool Equipment Type TE-30 contains the following tools:

- One pair 6-inch long-nose pliers (not side cutting).
- One pair 6-inch diagonal cutting pliers.
- One screwdriver, 5-inch blade.

The present standard Tool Equipment, Type TE-5, contains the following:

- One Knife, with screwdriver blade.
- One pair scissors.
- One pair pliers, 5-inch (side cutting).
- One file.
- One pair tweezers.
- One screwdriver, 3-inch blade.
- One rule, 24-inch, folding.

Although only the three tools enumerated are provided with the Tool Equipment Type TE-30, additional space is provided in the kit for one additional pair of pliers, a knife, and a few miscellaneous small parts.

Project No. 734, Karnes-Kessenich Machine Gun Mount.—Papers describing the Karnes-Kessenich Machine Gun Mount were submitted to the Coast Artillery Board by the designers, Maj. J. C. Karnes, Ord. Res., and Maj. G. J. Kessenich, C. A.-Res. The sighting system is based on speed of target, angle of approach and range. A study was made by the Board and report submitted.

Project No. 735, Confidential.

Project No. 736, Preparation of Training Regulation 435-55.—The Coast Artillery Board is making a complete revision of the text of Training Regulation 435-55, "Analysis of Drill, and Analysis and Reports of Target Practice."

From a letter of commendation addressed to Major General Preston Brown, Commanding the First Corps Area, by General Charles P. Summerall, Chief of Staff, the following is extracted:

"I especially wish to make of record my observation and appreciation of the work done by the caretakers of the Coast Artillery at the different fortifications of the Corps Area. The armament was uniformly in an excellent state of preservation and while only from two to four men were available for its maintenance, their untiring industry and devotion to duty have accomplished results far beyond those commensurate with the number of men employed. These men constitute a distinct and valuable asset to the service."

COAST ARTILLERY ORDERS

Maj. Gen. Andrew Hero, Jr., Chief of Coast Artillery, one month leave, August 20.

Col. Harold E. Cloke, Mass. Inst. Tech., placed on flying duty, September 2-17.

Col. Francis N. Cooke, leave two months twenty-seven days, September 5.

Lieut. Col. Louis C. Brinton, Jr., C. A. C., name placed on G. S. C. eligible list.

Lieut. Col. Henry T. Burgin, Chief of Coast Artillery's office, fifteen days' leave, September 16.

Lieut. Col. Charles C. Burt, C. A. C., name placed on G. S. C. eligible list.

Lieut. Col. Frank B. Edwards, to Colonel, August 8.

Lieut. Col. George L. Wertenbaker, G. S. C. (Washington), five days' leave, August 26.

Maj. Clair W. Baird, C. A. C., name placed on G. S. C. eligible list.

Maj. Albert D. Chipman, twenty-five days' leave, August 14.

Maj. Reginald B. Cocroft, from 6th Fort Scott to organized reserves, Milwaukee, Wis.

Maj. James H. Cunningham, 12th Fort Monroe, to command 61st Fort Monroe.

Maj. Walter K. Dunn, C. A. C., name placed on G. S. C. eligible list.

Maj. Henry W. T. Eglin, C. A. C., name placed on G. S. C. eligible list.

Maj. Ellicott Freeland, C. A. C., name placed on G. S. C. eligible list.

Maj. Charles A. French, First Coast Artillery District, placed on flying duty, September 2-17.

Maj. Robert E. Guthrie, from 61st Fort Monroe to 11th Fort H. G. Wright.

Maj. G. F. Humbert, C. A. C., named placed on G. S. C. eligible list.

Maj. Willis T. Knight, from instructor N. G., New York City, to organized reserves, Richmond, Va., September 30.

Maj. W. C. Koenig, C. A. C., name placed on G. S. C. eligible list.

Maj. Hollis LeR. Muller (Indianapolis), detailed in Air Corps, October 15, and to Brooks Field.

Maj. Willard K. Richards, C. A. C., name placed on G. S. C. eligible list.

Maj. Wilmer T. Scott, C. A. C., name placed on G. S. C. eligible list.

Maj. Harold E. Small, C. A. C., name placed on G. S. C. eligible list.

Maj. Samuel T. Stewart (Fitzsimons Hospital), to report before Retiring Board.

Maj. Samuel T. Stewart, C. A. C., named placed on G. S. C. eligible list.

Capt. Thomas J. Betts, relieved organized reserves, Third Corps Area, September 1.

Capt. Maitland Bottoms, to 61st Fort Monroe, orders to Philippines revoked.

Capt. Morris E. Conable, 3d Fort MacArthur, to Philippines, sailing San Francisco, December 6.

Capt. Coleman F. Driver, Letterman Hospital, to report before Retiring Board.

Capt. Benjamin F. Harmon, from 61st Fort Monroe, to Philippines; sailing New York, January 17.

Capt. Ralph E. Hill, from 61st Fort Monroe, to V. P. I., Blacksburg, Va.

Capt. William C. Kabrich, from Miss. A. & M. College, to Edgewood Arsenal.

Capt. Cedric F. Maguire, from 64th Fort Shafter, to 11th Fort Wright.

Capt. Earl R. Reynolds, from 9th Fort Banks, to student C. A. S., September 7.

Capt. Lucas E. Schoonmaker, from 61st Fort Monroe, to 13th Fort Barrancas.

Capt. Verne C. Snell, to Philippines; sailing San Francisco, December 6; leave extended two months and four days.

Capt. Joseph P. Sullivan, 64th Fort Shafter, transferred to Q. M. C., August 2.

Capt. John H. Wilson, detailed on Board of Review (field manuals).

1st Lieut. John H. Fonvielle, from Fort Hancock to West Point, August 24.

1st Lieut. Holstead C. Fowler, 12th Fort Monroe, transferred to F. A. August 10 and to Fort Sill.

1st Lieut. Albert D. Miller (Langley Field), relieved from detail in Q. M. C., detailed in Finance Department, August 1, and to Baltimore, Md.

1st Lieut. Harold P. Tasker, orders from 12th Fort Monroe to West Point, revoked.

1st Lieut. Fred B. Waters, relieved from detail in Q. M. C. (Fort Mason), to Philippines; sailing San Francisco, February 8.

2nd Lieut. Donald J. Bailey, from detail in Air Corps, Fort Sam Houston, to 52nd Fort Eustis, after two months' leave, September 6.

2nd Lieut. Charles G. Calloway (Williamsburg, Ky.), to Walter Reed.

2nd Lieut. Forrest J. French, from 11th Fort Wright, to 12th Fort Monroe.

2nd Lieut. Edward B. Hempstead (Seattle, Wash.), detailed in A. C., September 12, and to March Field.

2nd Lieut. Raleigh R. Hendrix, relieved detail in A. C., Fort Sam Houston, to 14th Fort Worden.

2nd Lieut. Joseph Horridge (Yonkers, N. Y.) to Panama; sailing New York, November 22.

2nd Lieut. Henry L. Hughes, from Philippines, to 52nd Fort Eustis.

2nd Lieut. William L. Johnson, to 1st Lieutenant, August 8.

2nd Lieut. Leslie G. Ross, to sail for Panama from New York, November 22.

2nd Lieut. Lawrence D. Solomonson, from Fort MacArthur, to home and await retirement.

2nd Lieut. Merle R. Thompson, to Hawaiian Department; sailing New York, September 27.

Master Sergt. George E. Handley, 59th Fort Mills, retired.

Master Sergt. Charles R. Heskett, 59th Fort Mills, retired.

1st Sergt. Eugene Parrett, 3d Fort MacArthur, retired.

Sergt. Charles Holle, 62nd Fort Totten, retired.

Private (1st class) Detlef M. Petersen, U. S. A. M. P., Harrison, Fort Mills, appointed assistant engineer, U. S. A. M. P. service, and to Fort Hancock, October 12.

Staff Sergt. Frank Matiasik, 7th Fort Dupont, retired.

Warrant Officer Silas H. Emory, from Fort Eustis to Fort Hancock.

Sergt. William E. Grimer, 10th Fort Adams, retired.

Staff Sergt. Gephart, 4th Fort Amador, appointed 2d Mate, A. M. P. S., July 17, and to Fort Scott.

Warrant Officer Nelson E. Smith, Master, A. M. P. S., from Philippines, to Fort Wright.

Warrant Officer Erik H. F. Lundblad, Master, A. M. P. S., from Fort Wright, to Philippines, sailing New York, January 17.

BOOK REVIEWS

Henry the VIII. By Francis Hackett. New York. Horace Liveright. 6" x 9".
Illus. 446 p. \$3.00.

The subtitle of this work is an excellent summary of the contents. "The Personal History of a Dynast and His Wives," as Mr. Hackett gives us intimate portraits of Bluff King Hal and his six spouses.

This was one of the most important reigns in the annals of England, as two events occurred which had lasting effect on the nation: the break with Rome and the inauguration of the historic policy of the Balance of Power in Europe. In each of these Henry played a conspicuous, if not leading, part, consequently these events are fully narrated, though the reader must be cautioned that being a "personal history," the personal element is given greater weight than in most histories of the period.

The story of the famous divorce from Catherine of Aragon is a fine piece of writing. Here will be found not only the actual events in the long six years' struggle, but an analysis of the feelings and motives of all the principals based on their acts. Henry, Catherine, Anne Boleyn, Cardinal Wolsey, Thomas Cromwell, Archbishop Crammer and the Pope are dissected and their characters laid bare for inspection. That this episode, which resulted in placing England in the list of Protestant nations, grew out of Henry's love for Anne Boleyn is well known, but Mr. Hackett goes even further, "Anne Boleyn's refusal to accept the rôle of Henry's mistress unconditionally changed the course of English history. If ever a slip of a girl owed it to the established order to satisfy her lover by a bond outside the bonds of matrimony, this was a clear instance. But she was not a coquette nor a wanton. She was a high-spirited, high-handed girl, who made marriage a term of her being and who, in spite of this, delivered herself to ruin." The current rumor that Anne was married to Lord Percy, her lover, before the king's interest was aroused, is not mentioned by Hackett.

On the highly controversial subject of Anne Boleyn's trial, the author is a staunch advocate of the queen, "Had her defense been irresistible it would still have been necessary to get rid of her . . . she was indicted not for unchastity but for unpopularity" and tried by "selected peers who had been her steadfast enemies." Mr. Hackett will find many opponents on this point.

England's historic policy of preventing any one nation from acquiring a dominant position in Europe dates from this reign. Cardinal Wolsey apparently inaugurated it, but, as Mr. Hackett says, "Henry's craft was sovereignty," and it was Henry who handled foreign affairs after Wolsey's death. Not only did he take England from the Roman Church, but he also aspired to place his country in the political position previously occupied by Rome; "England can be a better arbiter of Europe than any church if only because a hereditary monarchy is more stable than a monarchy where the sovereign is elected by a college of bribe-taking Cardinals. England's rôle was not, therefore, to ally itself with either Charles (the emperor) or Francis (of France) but to keep its principle fluid and to act as counterbalance and make-weight, never being caught on the end of the seesaw but doing its dance at the center, swaying contra rather than pro and always high-handed and impartial."

There we have an excellent summary of the rôle that England has occupied

for four hundred years in her international relations. "Swaying contra rather than pro" has invariably placed her in the lists against the dominant power. Spain, France and Germany have all aspired to world hegemony since the days of Henry VIII, and each has been successfully opposed by England in strict compliance with Henry's policy.

Probably no historian has given us as intimate a sketch of Thomas Cromwell as is contained in this work. He has been one of the enigmas of English history, but Mr. Hackett has lifted the veil and shown us the real man. While Henry dictated foreign policy, Cromwell engineered domestic affairs for his sovereign, and it is interesting to note that he is principally responsible for establishing the nearest approach to an absolute monarchy that England ever had, a power which was to be destroyed a hundred years later by another and a greater Cromwell, a descendant of Thomas' sister. The similarity in character between these two men is striking, although their talents were employed towards different objectives.

Mr. Hackett's book cannot be considered as flattering to Henry VIII. That monarch's private life was sordid at its best and it loses none of its sordidness in Mr. Hackett's hands, in fact his characterization places Henry distinctly below the level granted him by most historians. A mean between Froude's eulogy and Hackett's criticism probably represents the consensus of opinion.

The last chapter gives the historical background. The student who wishes to get a thorough comprehension of the political moves will do well to read it first, those interested only in Henry's private life will probably omit it altogether.

Taken all in all Mr. Hackett's work is a valuable contribution to the history of the Tudor period and will repay the most careful perusal.—R. E. W.

The Most Tragic Struggle of the Centuries. By Luigi Carnovale. Chicago: Humanitas Publishing Company. 1929. 5¼" x 7¾". 161 p. \$2.00.

In this little book the author gives an account of the struggle for unity which occurred in Italy between the Congress of Vienna in 1815 and the entry into Rome in 1870, which completed the new Kingdom. Without question this was a tragic struggle by the Italian people against oppression; oppression both by foreigners and by their own princes, but Mr. Carnovale's bias is so marked that the effect of the story is largely ruined for the discriminating reader.

He is particularly prejudiced against Austria and the House of Hapsburg—which held the northern part of Italy during the period—which shows itself throughout the book, and occasions some misrepresentations. In the opening paragraphs of the first chapter, for example, Mr. Carnovale lays the blame for the War of Austrian Succession on the Hapsburgs, considering Maria Theresa to be a usurper. This is contrary to the judgment of all critical historians and is apt to prejudice the reader of Mr. Carnovale's book at the outset, which is unfortunate, because he is better acquainted with Italian history, the real subject matter of the work, as is shown when he reaches the events which occurred in the peninsula. But even then, while the facts he gives can probably be relied on, the manner of their telling is not that of the historian, but of the partisan making out the strongest possible case for his own side.

No mention is made of the recent Vatican concordat, but, as the author highly approved the overthrow of the temporal power of the Pope in 1870, he leaves the impression of being opposed to its restoration.—R. E. W.

Leopold of the Belgians. By Comte Louis de Lichtervelde. Translated by Thomas H. Reed and H. Russell Reed. New York: The Century Co. 6" x 9". 357 p. \$4.00.

Leopold II, King of the Belgians, who reigned from 1865 to 1909, is the subject of this work by Count Lichtervelde who held a high position in the Belgian government during the World War with access to original documents from which he quotes freely.

To English-speaking readers Leopold is principally known as "a picturesque old man with an enormous beard, whose love affairs and African exploitations made 'news' a quarter of a century ago." The king himself said he would be satisfied if justice was done to his memory twenty years after his death, and Count Lichtervelde, whose book appears at that identical period, has done his best to present the real Leopold to the world.

It is in no sense a eulogy, neither is it a personal biography. It is a clear, dispassionate account of the official activities of the Belgian monarch, showing the influence he exerted on the development of Belgium during his long reign. That he was no figurehead is abundantly shown, his influence being evidently greater than that usually wielded in a limited monarchy. Not that he engaged in party struggles, he kept himself clear of such differences, but he had a broad view of Belgium's place in Europe and his efforts were directed toward raising the international status of his country, usually in opposition to the politicians of all parties. However, he was nothing if not persevering, and in the end he educated his cabinet and parliament toward his own way of thinking.

The acquisition of the Congo Free State as a Belgian colony was the direct work of the king. He conceived the idea and developed it against the desires of his people. For many years he governed the colony as an absolute monarch, the Belgian government having no voice in it, bringing it from an unknown, uncharted, savage territory to a paying basis. In fact, as Count Lichtervelde acknowledges, too much stress was paid to its finances and too little to the condition of its people, with the result that the world was shocked twenty-five years ago by the alleged Congo atrocities. The author shows that although greatly exaggerated statements of the conditions were made, Leopold's reputation suffered and the colony was formally annexed by Belgium in 1908 with a constitutional government.

The most interesting part of the Count's book to the military reader will undoubtedly be his account of Leopold's fight for national defense. The year after he ascended the throne the Austro-Prussian war took place with increased tension between France and Germany. The king was fully alive to the danger of his country, situated on the military highway between them, but means of defense were lacking. The neutralizing of Belgium by the nations had acted as a soporific to the people and statesmen, and Leopold could get no action in his own country. He then endeavored to bind England to take Belgium's part, should its neutrality be threatened, but "the ministers of Queen Victoria, faithful to the traditions of their country, refused absolutely to make in advance any definite agreements. A certain incapacity to foresee the course of events, an invincible horror of contingent promises, are the dominant traits of English statesmen. In all epochs of history, in spite of their evident will to do good, they have sinned by blindly letting pass the decisive moment, at the risk of imposing upon England the formidable efforts necessitated by a tardy falling into line." Many people believe that a definite stand by Britain in the trying days of July, 1914, would have saved Belgium and possibly averted the war. Have we not the same traits?

That particular danger passed but Leopold never relaxed his efforts to improve the national defense, and some of his writings on the subject are equally appropriate to our own condition. Thus in 1881 he wrote the following to his cabinet. "At the same time that we augment our wealth we must make sure of the national defense. . . . I have a profound conviction that the nations which do not profit by calm and prosperity to insure themselves against tempests, to protect from the caprices of fortune the treasures they have acquired, to assure, in a word, the defense of the fatherland, such nations are going to their doom."

The following quotation from a memorandum to the Prime Minister will strike a responsive chord in American hearts. "We must make it impossible for armies to cross Belgium without striking a blow. Not to do so would be veritable suicide. It would be to become again voluntarily the battlefield of France and Germany and to aid in the dismemberment of the country."

Gradually the king had his way, one after another his defense projects were adopted, but it was not until the year of his death that his plan was accepted in full. The fact that Belgium was willing and able to delay the Germans sufficiently to save the Allies in 1914 must be credited to King Leopold II.

This is an excellent work, both as a vindication of a much-villified monarch, and as a lesson in preparedness. The translators are to be congratulated on their easy flowing rendition.—R. E. W.

Black Roadways; A Study of Folk Life in Jamaica. By Martha Warren Beckwith. The University of North Carolina Press. 5¼ x 8¼. 226 p. \$3.00.

Jamaica, discovered by Columbus in 1494, continued under Spanish rule for one hundred and seventy-six years, when the island was formally ceded to England by the Treaty of Madrid. The native Indians having been virtually exterminated by the Spanish, the English planters imported African slaves in great numbers—the author of "Black Roadways" states that between 1655 and 1805 more than 850,000 blacks were landed in Jamaica and that today 94 per cent of the population is black or colored.

These slaves, brought from all parts of Africa, naturally differed radically in physical characteristics and culture, from the intelligent Kromanti of the Gold Coast to the purely negroid types of the lower Congo; but in time interbreeding produced a fairly homogeneous race as has been the case with the blacks in our own South.

In 1834 England emancipated her slaves in Jamaica and the majority of the freedmen settled on tiny tracts of land, where they earn a scanty living from the soil. A very small percentage of these descendants of slaves, educated in greater or less degree and with more comfortable incomes than their brothers of the small land holdings, hold themselves aloof from their own kind and "ridicule or censure the superstitions of the blacks." Another small class, known as the "bush people," live a primitive existence in the isolated districts of the interior. But it is with the great mass of the freedmen, the small farmer, the "black peasantry," "whose poverty prevents their adoption of British standards," that Miss Beckwith's book is concerned.

The result of patient and intelligent observation during four visits to Jamaica, "Black Roadways" contains an amazing amount of detailed information on the Jamaican negro—his living conditions, his environment, his work, his family life, his religion, his customs and his folk art are all fully discussed, together with the folk lore touching each phase of his daily existence. The accumulated superstitions and beliefs having to do with planting, building, marriage, birth, death and social life are so numerous as to fairly bewilder the reader—there

seems scarcely an act in the daily life of the Jamaican negro that is not colored by his belief in a world of spirits that surrounds him; spirits willing to be propitiated or quick to anger.

With such a background it is natural that the obeah religion flourishes—"the religion of the shadow world, the religion of fear, suspicion and revenge." The priest or priestess of obeah, possessed of special powers to control spirits, wields tremendous power in the negro communities, too often a power that is against the best interests of the community and the individual. The chapters on the spirit world and the obeah religion are particularly interesting, and according to Miss Beckwith's interpretation, obeah as practiced in Jamaica, while mischievous enough in its power to undermine men's health and minds and to change their material fortunes, lacks the sinister and murderous manifestations found in Voodoo, the religion of the spirit world as practiced in other islands of the West Indies.

"Various religious sects have flourished from time to time in Jamaica who claimed the power to remove the spells of obeah, but always through counter-spells of their own based upon the same idea of spirit possession. It is easy to see, therefore, that they have only served to increase the confusion of mind of those whom they pretend to aid, and that, under the same incentives of greed and lust, they may lend themselves to the same arts as the obeah man in duping the credulous." Mill Beckwith discusses three of these sects: the Myal Men, directly African in origin; the Revivalists, influenced by the Christian religion but claiming power against their rivals "through their own gift of communication with the spirit world; and the Pukkumerians, a sect combining the beliefs of Myalism and Revivalism, with a few of their own ideas thrown in for good measure. The author of "Black Roadways" attended meetings of these various sects, talked with their followers and visited some of the more noted leaders, particularly Bedward, the prophet of August Town, who "dreamed the impossible"; Mammy Forbes, the Revivalist healer, and the Pukkumerian shepherds, "Mr." Mighty and Sam Thompson.

Miss Beckwith made several trips to the free Maroon settlements of Accompong and More Town, and devotes one chapter of her book to these little-known and interesting people. Although there are several theories put forth to account for their origin, the Maroon people probably owe their origin to bands of slaves who escaped from their Spanish masters and entrenched themselves in the fastnesses of the hills of the interior of Jamaica. After years of fighting in the attempt to subjugate the Maroons England finally signed a treaty with their leaders, giving them title to certain lands. In return the Maroons "promised perpetual league with the whites in case of war and the return in the future of runaway slaves to their masters. . . . In this way the Maroons became the natural friends of the whites and the enemies of the enslaved of their own race, a distinction which they jealously guard today. . . . They form in some respects a secret society which excludes all non-Maroons from entrance within the settlement unaccompanied by a white man or a Maroon and which preserves certain so-called Kromanti customs as a proof of their African pride of blood." In the last uprising in Jamaica the Maroons fought on the side of the English, and in the World War they enlisted for service overseas.

The book concludes with a chapter on folk art—stories, games, songs and dances—the emotional outlet of a highly emotional people. "Black Roadways" is filled with facts about a little known people, facts not only new to the average reader but highly informative and interesting, and Miss Beckwith's simple narrative style of writing makes smooth and easy reading.—E. L. B.